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MINERAL PRODUCTION OF CANADA

DURING THE CALENDAR YEAR

1914

JOHN McLEISH, B.A.

MINES BRANCH
DEPARTMENT OF MINES
OTTAWA

1916

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CANADA
DEPARTMENT OF MINES
HON. P. E. BLONDIN, MINISTER; R. G. MCCONNELL, DEPUTY MINISTER.

MINES BRANCH
EUGENE HAANEL PH.D., DIRECTOR.

ANNUAL REPORT
ON THE
MINERAL PRODUCTION OF CANADA
During the Calendar Year
1914



JOHN McLEISH, B.A.
Chief of the Division of Mineral Resources and Statistics.



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LETTER OF TRANSMITTAL.

DR. EUGENE HAANEL,
Director of Mines,
Department of Mines, Ottawa.

SIR,—I beg to hand you, herewith, the Annual Report on the Mineral Production of Canada, giving revised statistical information descriptive of the mining and metallurgical production in Canada during the calendar year 1914.

A preliminary report on the mineral production during 1914 was sent to press February 24, 1915, and issued within the following week.

Parts of the present report—including “Report on the Production of Iron and Steel in Canada during 1914,” “Report on the Production of Copper, Gold, Lead, Nickel, Silver, Zinc, and Other Metals, in Canada, during 1914,” “Report on the Production of Coal and Coke in Canada, during 1914,” and “Report on the Production of Cement, Lime, Clay Products, Stone, and Other Structural Materials in Canada, during 1914,” have already been separately published.

In the preparation of this Report, Mr. A. Buisson has contributed largely to the compilation of the special chapters on gold, silver, copper, lead, nickel, zinc, and miscellaneous metallic minerals; Mr. L. L. Bolton the chapters on coal and coke, tripolite, asbestos, gypsum, mica, natural gas, petroleum, and other non-metallic products; while Mr. J. Casey has, as usual, given particular care to the compilation of the statistical tables.

Grateful acknowledgment is made of the hearty co-operation of mine and smelter operators who have almost without exception cheerfully complied with our requests, and furnished the department with statistics and information regarding their operations.

The work of this Division fell into arrears and the compilation of the Annual Report was considerably delayed through the unfortunate illness and death of Mr. Cosmo T. Cartwright.

I have the honour to be, Sir,

Your obedient servant,

John McLeish.

DIVISION OF MINERAL RESOURCES AND STATISTICS,
October 19, 1915.

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EXPLANATORY NOTES.

The term "ton" used throughout this report signifies a ton of 2,000 pounds; while the year referred to means calendar year, unless otherwise stated. The Government fiscal year formerly ended on the 30th of June; but now terminates on the 31st of March. This change took place in 1907, hence the fiscal period ending March 31, 1907, covers only nine months.

Statistics of exports and imports given throughout this report are compiled from the reports of Trade and Navigation, published by the Customs Department.

The term "production" used throughout this report may in general be interpreted as meaning the quantity sold or shipped. Mineral products mined or manufactured, but not sold or shipped, at the end of the year, are not included as "production." An exception to this usage will be found in reference to pig-iron, in which case the statistics of production represent the quantities made.

The value of the metallic minerals produced, whether refined in Canada or not, is calculated on the basis of the average price of the metal in some recognized market. New York prices have usually been taken as the standard. In the case of lead, however, the New York price is so much higher than that of London, that the Montreal price—about midway between these two—is now used. The value of non-metallic products is given as at the mine or point of shipment.

THE MINERAL PRODUCTION OF CANADA

During the Calendar Year

1914

General Summary.

Broad statements of the mineral production of the country in terms of a total valuation are of chief importance from the point of view of comparison.

The term 'mineral production' is so comprehensive that there is a wide divergence in methods, not only in the compilation of quantities of mineral products, but also in the adoption of a basis of valuation. During the past five years the reports published by this Division have presented results obtained from two methods of compiling statistics of metal production, or the production of metalliferous ores. In the first method, which has been the basis of the statistics here shown since 1886, the metallic production is stated in terms of the refined or recoverable metals produced and valued at the values of the refined metals. In the other method, a total is compiled on the basis of the values of the ores produced or shipped from the mines in so far as these values are reported or are obtainable, a method which naturally gives a total aggregate value somewhat lower than that of the refined product, since the metallurgical operation is not included. There are naturally exceptions to the general principles in each case.

Another method sometimes used to arrive at a total value of production of metallic ores is to calculate the total metal contents of ores shipped, as per sampling analyses and value the metals either at the full market value, or a percentage thereof, or a deduction may be made from the total quantities of metals to allow for smelter losses.

Whether these or other methods be used to arrive at a total, the result is certain to be subject to criticism because of some difficulty or inconsistency, so that, as already stated, the total value is useful chiefly as a means of comparing the results of one year with those of another, or with the production in other countries, the records of which happen to be compiled on a similar basis.

The records of greatest importance in mineral statistics are those showing the quantities of products produced and shipped from mines and works, the home consumption, and the foreign trade, and in this respect, it has been endeavoured to make the report as complete as possible.

The method employed in the reports of this Department of presenting a total valuation on the basis of the quantities of metals recovered in smelt-

ers in Canada, or probably recovered from ores exported and valued at recognized market values is in close agreement with that used in the United States and has been found the most satisfactory in meeting the variety of conditions which arise.

The quantities thus given will differ from those which represent metal contents of ore shipped by amounts due (1) to losses in smelting (2) to the "lag" or lapse of time between the ore shipment and its treatment in the smelter. Thus, the production of refined lead during the past two years has been very much lower than that reported as contained in ores shipped from the mines, the difference being due both to smelter losses and the large accumulation of ore at the smelter.

The total value of the mineral production in Canada in 1914 was thus \$128,863,075 or an average value per capita of \$15.96, as compared with a total value in 1913 of \$145,634,812, or an average per capita of \$18.77, thus showing a falling off in 1914 of \$16,771,737, or 11.52 per cent.

The records of the annual mineral production in Canada since 1886 shown in the following table indicate the rapid growth which the mineral industry has made in Canada.

Annual Mineral Production in Canada since 1886.

| Year. | Value of production. | Value per capita. | Year. | Value of production. | Value per capita. |
|-----------|-------------------------|----------------------|-----------|-------------------------|----------------------|
| | \$ | \$ cts. | | \$ | \$ cts. |
| 1886..... | 10,221,255 | 2 23 | 1901..... | 65,797,911 | 12 16 |
| 1887..... | 10,321,331 | 2 23 | 1902..... | 63,231,836 | 11 36 |
| 1888..... | 12,518,894 | 2 67 | 1903..... | 61,740,513 | 10 83 |
| 1889..... | 14,013,113 | 2 96 | 1904..... | 60,082,771 | 10 27 |
| 1890..... | 16,763,353 | 3 50 | 1905..... | 69,078,999 | 11 49 |
| 1891..... | 18,976,616 | 3 92 | 1906..... | 79,286,697 | 12 81 |
| 1892..... | 16,623,415 | 3 39 | 1907..... | 86,865,202 | 13 75 |
| 1893..... | 20,035,082 | 4 04 | 1908..... | 85,557,101 | 13 16 |
| 1894..... | 19,931,158 | 3 98 | 1909..... | 91,831,441 | 13 70 |
| 1895..... | 20,505,917 | 4 05 | 1910..... | 106,823,623 | 14 93 |
| 1896..... | 22,474,256 | 4 38 | 1911..... | 103,220,994 | 14 42 |
| 1897..... | 28,485,023 | 5 49 | 1912..... | 135,048,296 | 18 27 |
| 1898..... | 38,412,431 | 7 32 | 1913..... | 145,634,812 | 18 77 |
| 1899..... | 49,234,005 | 9 27 | 1914..... | 128,863,075 | 15 96 |
| 1900..... | 64,420,877 | 12 04 | | | |

The total value of the production in 1886 was \$10,221,255, or about \$2.23 per capita. In ten years the value had increased to \$22,474,256, or \$4.38 per capita, more than twice the total in 1886, and nearly twice the production per capita. The next ten years witnessed an increase to \$79,286,697 in 1906, or \$12.81 per capita, about $3\frac{1}{2}$ times the production in 1896. From 1906 to 1913 the total production showed an increase of over 80 per cent with an increase of nearly 50 per cent in production per capita. The decrease of 1914 will no doubt be made up very soon after the war and a return to normal conditions of industrial development.

The detailed comparative statement here presented shows the production of each important product during the past two years, the production which each contributes to the total production, and the increase or decrease as the case may be of the production, in 1914 as compared with that of 1913.

Comparative Statement of Mineral Production for Years 1913 and 1914.

| Product. | 1913. | | | | 1914. | | | | Increase (+) or Decrease (-). | | |
|---|------------|------------|--------------------|------------|------------|--------------------|-----------|--------|-------------------------------|-------------------------------|--|
| | Quantity. | Value (\$) | Per cent of total. | Quantity. | Value (\$) | Per cent of total. | Quantity. | Value. | % | Increase (+) or Decrease (-). | |
| | | | | | | | | | | | |
| <i>Metallic.</i> | | | | | | | | | | | |
| Cobalt oxide..... Lbs. | 660,079 | | | 899,027 | | | 238,948 | | | | |
| Nickel oxide..... "a | 268,304 | | | 392,512 | | | 124,208 | | | | |
| Cobalt material, mixed cobalt and nickel oxides..... "a | | 605,589 | 0.48 | | 606,593 | 0.53 | | | | | |
| Copper (b)..... "a | 76,976,925 | 90,266 | | 75,735,960 | 79,995 | | | | | | |
| Gold..... Ozs. | 802,973 | 11,753,606 | 8.07 | 773,178 | 10,301,606 | 8.07 | | | | | |
| Iron pig from Canadian ore (c)..... *Tons | 73,508 | 16,598,929 | 11.40 | 773,178 | 15,983,072 | 12.40 | | | | | |
| Iron ore sold for export (d)..... "a | 216,614 | 996,423 | 0.68 | 996,423 | 1,138,912 | 0.88 | | | | | |
| Lead (e)..... Lbs. | 37,662,703 | 430,561 | 0.30 | 60,410 | 135,300 | 0.11 | | | | | |
| Molybdenum ore..... "a | 49,676,772 | 14,903,032 | 10.23 | 36,337,765 | 1,627,568 | 1.27 | | | | | |
| Nickel (e)..... "a | 31,845,803 | 19,040,924 | 13.07 | 45,517,937 | 3,814 | 0.39 | | | | | |
| Platinum..... Crude ozs. | 7,889 | 186,827 | 0.13 | 28,449,821 | 15,593,631 | 12.10 | | | | | |
| Silver (f)..... "a | | | | 10,893 | 262,563 | 0.20 | | | | | |
| Zinc ore..... *Tons | | | | | | | | | | | |
| Total..... | | 66,361,351 | 45.57 | | 59,386,619 | 46.15 | | | | | |

Comparative Statement of Mineral Production for Years 1913 and 1914.—Continued.

| Product. | 1913. | | | 1914. | | | Increase (+) or Decrease (-). | | Value. | % | Increase (+) or Decrease (-). |
|---------------------------|------------|------------|-------------------|------------|------------|-------------------|-------------------------------|--------|------------|-------|-------------------------------|
| | Quantity. | Value. (a) | Per cent of total | Quantity. | Value. (a) | Per cent of total | Quantity. | % | | | |
| Non-metallic. | | | | | | | | | | | |
| Actinolite..... | 66 | 720 | ..... | 119 | 1,304 | ..... | 53 | 80.25 | 584 | 81.11 | |
| Arsenious oxide..... | 1,692 | 101,463 | *0.07 | 1,737 | 104,015 | ..... | 45 | 2.66 | 2,552 | 2.51 | |
| Asbestos..... | 136,951 | 3,830,909 | 2.63 | 96,542 | 2,892,266 | 2.22 | 40,409 | 29.51 | 938,643 | 24.50 | |
| Asbestic..... | 24,135 | 19,016 | ..... | 21,031 | 17,540 | ..... | 3,104 | 12.86 | 1,476 | 7.76 | |
| Chromite..... | ..... | ..... | ..... | 136 | 1,210 | ..... | 136 | ..... | 1,210 | ..... |  |
| Coal..... | 15,012,178 | 37,334,940 | 25.64 | 13,637,529 | 33,471,801 | 25.97 | 1,374,649 | 9.16 | 3,863,139 | 10.35 | |
| Corundum..... | 1,177 | 137,036 | 0.09 | 548 | 72,176 | .05 | 629 | 53.44 | 64,860 | 47.33 | |
| Feldspar..... | 16,790 | 60,795 | ..... | 18,060 | 70,824 | .05 | 1,270 | 7.56 | 10,029 | 16.50 | |
| Graphite..... | 2,162 | 90,282 | 0.06 | 1,647 | 107,203 | .08 | 515 | 23.82 | 16,921 | 18.74 | |
| Graphite, artificial..... | 1,092 | ..... | ..... | 617 | 54,504 | .04 | 475 | 43.49 | ..... | ..... |  |
| Grindstones..... | 4,837 | 51,325 | ..... | 3,976 | 54,504 | ..... | 861 | 17.83 | 3,179 | 6.19 | |
| Gypsum..... | 636,370 | 1,447,739 | 0.99 | 516,880 | 1,156,207 | .89 | 119,490 | 18.78 | 291,532 | 20.14 | |
| Magnesite..... | 515 | 3,335 | ..... | 358 | 2,240 | ..... | 157 | 30.49 | 1,095 | 32.83 | |
| Manganese..... | ..... | ..... | ..... | 28 | 1,120 | ..... | 28 | ..... | 1,120 | ..... |  |
| Mica..... | ..... | 194,304 | 0.13 | ..... | 109,061 | .08 | ..... | ..... | 85,243 | 43.87 | |
| Mineral pigments— | | | | | | | | | | | |
| Barytes..... | 641 | 6,410 | ..... | 612 | 6,169 | ..... | 29 | 4.52 | 241 | 3.76 | |
| Ochres..... | 5,987 | 41,774 | ..... | 5,890 | 51,725 | .04 | 97 | 1.62 | 9,951 | 23.82 | |
| Mineral water..... | ..... | 173,677 | 0.12 | ..... | 134,111 | .10 | ..... | ..... | 39,566 | 22.78 | |
| Natural gas (g.)..... | 20,477,838 | 3,309,381 | 2.27 | 21,692,504 | 3,484,727 | 2.70 | 1,214,666 | 5.93 | 175,346 | 5.30 | |
| Peat..... | 2,600 | 10,100 | ..... | 685 | 2,470 | ..... | 1,195 | 73.65 | 7,630 | 75.54 | |
| Petroleum..... | 228,080 | 406,439 | 0.28 | 214,805 | 343,124 | .28 | 13,275 | 5.82 | 63,315 | 15.58 | |
| Phosphate..... | 385 | 3,643 | ..... | 954 | 7,275 | ..... | 569 | 147.00 | 3,632 | 99.70 | |
| Pyrites..... | 158,566 | 521,181 | 0.36 | 228,314 | 744,508 | .57 | 69,748 | 43.99 | 223,327 | 42.85 | |
| Quartz..... | 78,261 | 169,842 | 0.12 | 54,148 | 84,583 | .06 | 24,127 | 30.83 | 85,259 | 50.20 | |
| Salt..... | 100,791 | 491,280 | 0.38 | 107,038 | 493,648 | .38 | 6,247 | 6.20 | 2,368 | 0.48 | |
| Talc..... | 12,250 | 45,980 | ..... | 10,808 | 40,418 | .03 | 1,442 | 11.77 | 5,562 | 12.10 | |
| Trippolite..... | 620 | 12,138 | ..... | 650 | 13,000 | ..... | 30 | 4.84 | 862 | 7.10 | |
| Total..... | ..... | 48,463,709 | 33.28 | ..... | 43,467,229 | 33.72 | ..... | ..... | -4,996,480 | 10.31 | |

Structural Materials and Clay Products.

| Cement, Portland..... | Bls. | 8,658,805 | \$ | % | 7,172,480 | \$ | % | 1,486,325 | \$ | 17.16 |
|---|---------|-------------|-------------|--------|-------------|-------------|--------|-------------|------------|--------|
| Clay products— | | | | | | | | | | |
| Brick, common..... | No. | 668,426,675 | 5,917,373 | 4.07 | 457,513,762 | 3,653,861 | 2.83 | 210,912,913 | 31.55 | 38.25 |
| Brick, pressed..... | " | 116,802,053 | 1,458,733 | 1.00 | 93,634,858 | 1,115,556 | .80 | 23,167,195 | 19.83 | 23.53 |
| Brick, paving..... | " | 4,208,295 | 75,669 | ..... | 2,707,000 | 49,627 | .03 | 1,501,295 | 35.67 | 34.42 |
| Brick, moulded and ornamental..... | | 875,355 | 15,423 | ..... | 1,554,496 | 23,592 | ..... | 679,141 | 77.58 | 52.97 |
| Fireclay, and fireclay products..... |  | ..... | 142,738 | 0.10 | ..... | 107,568 | .08 | ..... | 35,170 | 24.54 |
| Fireproofing architectural terra-cotta..... |  | ..... | 461,387 | 0.32 | ..... | 405,543 | .31 | ..... | 55,844 | 12.10 |
| Kaolin..... | Tons | 500 | 5,000 | ..... | 1,000 | 10,000 | ..... | 500 | 5,000 | 100.00 |
| Pottery..... |  | ..... | 53,533 | ..... | ..... | 35,371 | .02 | ..... | 18,162 | 33.93 |
| Sewer-pipe..... |  | ..... | 1,035,906 | 0.66 | ..... | 1,104,499 | .84 | ..... | 68,593 | 6.21 |
| Tile, drain..... | No. | ..... | 338,552 | 0.24 | ..... | 366,340 | .28 | ..... | 27,788 | 8.22 |
| Tile, plain..... | No. | ..... | 7,558,484 | 1.11 | 7,028,582 | 1,360,628 | 1.05 | 529,902 | 7.01 | 15.46 |
| Lime..... | Bus | 92,586,676 | 1,906,665 | 0.63 | 70,650,030 | 609,515 | .47 | 21,936,646 | 23.69 | 32.77 |
| Sand-lime brick..... | No. | ..... | 2,258,874 | 1.56 | ..... | 2,505,310 | 1.94 | ..... | 246,436 | 10.91 |
| Sand and gravel (n)..... | | 1,432 | 6,444 | ..... | 1,075 | 4,837 | ..... | 357 | 1,607 | 24.93 |
| Slate..... | Squares | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... |
| Stone— | | | | | | | | | | |
| Granite..... |  | ..... | 1,653,791 | 1.14 | ..... | 2,176,602 | 1.69 | ..... | 522,811 | 31.61 |
| Limestone..... |  | ..... | 3,204,091 | 2.20 | ..... | 2,672,781 | 2.08 | ..... | 531,310 | 16.58 |
| Marble..... |  | ..... | 249,975 | 0.71 | ..... | 132,533 | .10 | ..... | 117,442 | 46.98 |
| Sandstone..... |  | ..... | 396,782 | 0.28 | ..... | 487,140 | .38 | ..... | 90,358 | 22.77 |
| Total..... |  | ..... | 30,809,752 | 21.15 | ..... | 26,009,227 | 20.03 | ..... | 4,800,525 | 15.58 |
| Grand total..... |  | ..... | 145,634,812 | 100.00 | ..... | 128,863,075 | 100.00 | ..... | 17,078,544 | 11.73 |

*Short tons throughout. (a) The metals copper, lead, nickel, and silver are for statistical and comparative purposes valued at the final average value of the refined metal. Pig-iron, zinc, and cobalt oxides are valued at the final average value of the refined metal. (b) Copper content of smelter products and estimated recoveries from slag reported for 1913, and for metallic products at the mine or point of shipment for 1914. (c) The total production of pig-iron in Canada in 1913 was 1,128,967 tons valued at \$1,540,012, which is estimated at 1,055,459 tons valued at \$1,515,583 should be credited to production of pig-iron in the total production was 783,164 tons valued at \$10,002,856, of which 687,420 tons valued at \$8,863,944 are credited to imported ores. (d) Refined lead and lead contained in base bullion exported at 4.659 cents per pound in 1913 and 4.479 cents in 1914 the average prices in Montreal. (e) Nickel content of matte produced valued at 30 cents in 1913 and 1914. (Increasing quantities of nickel-copper matte are now being used in making metal which is sold at a price much below that of refined nickel). The value of the nickel contained in matte as returned by the operators, was about 10 cents per pound for both years. (f) Estimated recoverable silver at 59.791 cents per ounce in 1913 and at 54.811 cents in 1914. (g) Gross returns for sale of gas. (h) In 1913 and 1914 figures as reported by the producers, which differ slightly from those of the Trade and Navigation reports. (n) Partial record only of production.

It will be observed that there has been a general falling off in the production of nearly all mine products, the notable exceptions being, pyrites, salt, and natural gas. In the case of pyrites, there is an increase of about 43 per cent, and about 6 per cent in quantity of salt produced. The quantity and value of natural gas produced shows an increase of about 6 per cent.

The falling off in the production of the metals is no doubt to be ascribed in large measure to the conditions resulting from the war. Especially is this true in the case of the metals: copper, nickel, and silver. The cutting off of markets and the closing of metal exchanges with the consequent cessation of market quotations resulted in the almost immediate closing down or restriction of operation at many properties. However, before the close of the year, many of these adverse conditions had been adjusted although prices had fallen considerably.

The actual quantities of copper and lead produced were but little less than in the previous year; nickel showed a decrease of 8 per cent, and silver of 10·6 per cent in quantity.

The total values, because of lower prices, showed much larger percentage decreases.

The iron industry was undoubtedly affected by industrial conditions of depression and shows a falling off of 30 per cent in tonnage of pig-iron made.

The total value of the metallic production in 1914 was \$59,386,619 as against \$66,361,351, a decrease of \$6,974,732 or 10 per cent.

With the exception of lead and nickel all the chief metals showed a falling off in price in 1913 as compared with 1912. The same metals showed a further falling off in 1914. Copper dropped from 15·269 cents per pound to 13·602 cents, a decrease of 1·667. Silver dropped from 59·791 cents per ounce on the New York market to 54·811 cents, a loss of 4·980 cents per ounce. The average price of spelter in New York decreased from 5·648 cents per pound in 1913 to 5·213 cents in 1914, and tin from 44·252 cents per pound in 1913 to 34·301 cents in 1914. The average price of lead in London increased from 4·072 cents per pound in 1913 to 4·146 cents in 1914, but the Montreal and New York prices showed a falling off.

Metal Prices.

| | 1909. | 1910. | 1911. | 1912. | 1913. | 1914. |
|-----------------------|--------|--------|--------|--------|--------|--------|
| | Cts. | Cts. | Cts. | Cts. | Cts. | Cts. |
| Copper, New York..... | 12·982 | 12·738 | 12·376 | 16·341 | 15·269 | 13·602 |
| Lead, " "..... | 4·273 | 4·446 | 4·420 | 4·471 | 4·370 | 3·862 |
| " London..... | 2·839 | 2·807 | 3·035 | 3·895 | 4·072 | 4·146 |
| " Montreal*..... | 3·268 | 3·246 | 3·480 | 4·467 | 4·659 | 4·479 |
| Nickel, New York..... | 40·000 | 40·000 | 40·000 | 40·000 | 40·000 | 40·000 |
| Silver, "..... | 51·503 | 53·486 | 53·304 | 60·835 | 59·791 | 54·811 |
| Spelter, "..... | 5·503 | 5·520 | 5·758 | 6·943 | 5·648 | 5·213 |
| Tin, "..... | 29·725 | 34·123 | 42·281 | 46·096 | 44·252 | 34·301 |

*Quotations furnished by Messrs. Thomas Robertson & Company, Montreal, Que.

The total value of the non-metallic production in 1914 was \$69,476,456, as against \$79,273,461 in 1913, a decrease of \$9,797,005 or 12·36 per cent.

The decrease was most pronounced in the case of coal, asbestos, gypsum, petroleum, and corundum, and in those products such as cement, clay products (building brick, sewer pipe, etc.), and lime, generally classed as structural materials, although there was a small increase in the production of stone quarries.

Industrial depression, the culmination of over-development and extravagant land speculation is largely responsible for this sudden reverse, although the asbestos output would be restricted by the disturbance in foreign markets, and the coal production would also be affected by the restricted metallurgical operations.

Reference has already been made to the increased production of pyrites, salt, and natural gas. There were also slight increases in the production of white arsenic, feldspar, grindstones, ochres, phosphate, and tripolite. Asbestos shows a decrease of 29 per cent in tonnage and 24 per cent in value, coal a decrease of 9 per cent in tonnage and 10 per cent in value, petroleum a decrease of 5·8 per cent in quantity and 15·6 per cent in value, clay products nearly 28 per cent in total value, and lime 7 per cent in quantity and 15 per cent in value.

Coal is still the most important mineral product in Canada in point of value of production, having contributed 26 per cent of the total in 1914. The metals came next in importance with gold contributing 12·4 per cent, silver 12·1 per cent, nickel 10·6 per cent and copper 8 per cent. The production of cement made up 7·13 per cent of the total, clay products 5·3 per cent, stone quarries 4·24 per cent, natural gas 2·7 per cent, and asbestos 2·24 per cent.

The production of pig-iron given in the general table includes only that proportion of the output of Canadian blast furnaces credited to Canadian ores. There is an important production of pig-iron from imported ores (shown in the footnotes of the general table, and in the chapter on iron and steel) and the total value thereof in 1914 was exceeded only by the production of coal, gold, silver, copper, and nickel. There is also a large production of aluminium from imported ores, for which no value is included in the general table of production.

EXPORTS AND IMPORTS.

A very large portion of the mineral production of Canada is exported for consumption or refining outside of Canada. On the other hand considerable quantities of mine products, chiefly those which have been refined or subjected to partial treatment, or in the form of manufactured goods ready for consumption, are imported.

The total value of the exports of products of the mine, including direct mine products and manufactures thereof, in 1914 was \$75,533,305 compared

with \$79,803,874 in 1913. This value includes for 1914, mine products to the value of \$53,781,102, and manufactures valued at \$21,752,203, as against mine products valued at \$50,073,167, and manufactures valued at \$20,730,707 in 1913.

Practically the whole of the Canadian production of copper, nickel, and silver is exported, also a very large proportion of the production of gold, asbestos, and mica. There are, as well, considerable exports of coal. These products alone contribute about 93 per cent of the value of the mine products exported. Manufactured products exported consist chiefly of iron and steel goods, agricultural implements, aluminium, calcium carbide, acetate of lime, fertilizers, and coke.

The United States is the chief destination of Canada's mine exports, about 67 per cent having been exported to that country during the fiscal year 1913-1914, and about 27 per cent to the United Kingdom.

A great variety of mineral products, chiefly in a manufactured or semi-manufactured condition, are annually imported into Canada, and these imports have been increasing with much greater rapidity than has Canada's domestic mineral production. The total value of such imports during the calendar year 1914, was \$181,374,250 as compared with imports valued at \$259,299,745 in 1913; \$238,212,835 in 1912; \$181,773,708 in 1911, and \$147,305,012 in 1910. Of the total imports in 1913, over \$46,000,000 was made up of the cruder forms of mineral products such as coal, diamonds unset and bort, iron ore, asphaltum, ores of metals, alumina, sand and gravel, etc., as against \$58,000,000 for similar products in 1913.

The imports of iron and steel in 1914 included in this table, were valued at \$79,762,262, as against \$145,226,792 in 1914. Imports of the metals, aluminium, antimony, copper, gold, silver, lead, platinum, tin, and zinc, and manufactures thereof, and metallic alloys, reached a total value of over \$30,000,000, as compared with a value of over \$22,000,000 in 1913; petroleum and products of, \$11,072,362, as against \$13,238,429 in 1913; clays and clay products, \$4,407,140, as against \$6,760,752 in 1913.

EXPORTS.

Exports of the Products of the Mine and of Manufactures of Mine Products—Calendar Years 1913 and 1914.

| | 1913. | | 1914. | |
|--|------------|------------|------------|------------|
| | Quantity. | Value. | Quantity. | Value. |
| MINE PRODUCTS. | | \$ | | \$ |
| Arsenic.....Lbs. | 2,606,767 | 107,094 | 3,751,900 | 132,567 |
| Asbestos.....Tons | 103,812 | 2,848,047 | 81,081 | 2,298,646 |
| Asbestos sand....." | 24,766 | 138,737 | 18,991 | 108,548 |
| Coal....." | 1,562,020 | 3,961,351 | 1,423,126 | 3,880,175 |
| Copper, fine in ore, etc.....Lbs. | 81,879,080 | 9,479,480 | 68,830,059 | 7,130,778 |
| " black or coarse and in pigs....." | 771,280 | 123,431 | 6,581,564 | 908,201 |
| Feldspar.....Tons | 15,966 | 62,767 | 18,072 | 74,100 |
| Gold.....\$ | | 12,770,838 | | 15,242,200 |
| Gypsum.....Tons | 417,302 | 504,383 | 345,830 | 404,234 |
| Lead, in ore, etc.....Lbs. | 329,960 | 9,136 | 246,100 | 2,681 |
| Lead, pig, etc....." | | | 510,573 | 19,507 |
| Mica....." | 817,152 | 240,775 | 669,163 | 178,940 |
| Mineral pigments....." | 3,912,400 | 18,931 | 3,554,900 | 22,311 |
| Mineral water.....Gals. | 3,640 | 526 | 2,287 | 599 |
| Nickel, in ore, etc.....Lbs. | 49,459,017 | 5,195,560 | 46,528,327 | 5,149,427 |
| Oil, mineral, crude, etc.....Gals. | 3,650 | 379 | 3,996 | 362 |
| Oil, refined....." | 24,273 | 3,188 | 3,922 | 826 |
| Ores— | | | | |
| Corundum.....Tons | 1,077 | 121,741 | 947 | 87,740 |
| Iron....." | 126,124 | 426,681 | 135,451 | 360,974 |
| Manganese....." | 8 | 303 | 30 | 750 |
| Other ores....." | 10,835 | 658,808 | 12,770 | 782,437 |
| Phosphates....." | | | 247 | 677 |
| Platinum.....Ozs. | 158 | 7,929 | 43 | 2,161 |
| Plumbago.....Cwt. | 32,842 | 85,368 | 18,375 | 50,528 |
| Pyrites.....Tons | 46,066 | 211,640 | 89,999 | 377,985 |
| Salt.....Cwt. | 4,609 | 3,047 | 9,527 | 5,229 |
| Sand and gravel.....Tons | 644,633 | 440,956 | 952,370 | 802,358 |
| Silver.....Ozs. | 37,371,569 | 21,441,220 | 28,020,089 | 15,584,813 |
| Stone, building.....Tons | 191,981 | 82,646 | 63,009 | 46,198 |
| " ornamental....." | 1,942 | 687 | 231 | 5,607 |
| " crushed....." | 4,814 | 3,126 | 25,130 | 18,153 |
| " for manufacture of grindstones....." | | | 54 | 294 |
| Other products of the mine..... | | 124,392 | | 101,096 |
| Total mine products..... | | 59,073,167 | | 53,781,102 |

EXPORTS.

Exports of the Products of the Mine and of Manufactures of Mine Products—Calendar Years 1913 and 1914.—Continued.

| | 1913. | | 1914. | |
|---|------------|------------|------------|------------|
| | Quantity. | Value. | Quantity. | Value. |
| | | \$ | | \$ |
| MANUFACTURES. | | | | |
| Acetate of lime.....Lbs. | 14,902,990 | 322,069 | 16,052,255 | 282,146 |
| Acid, sulphuric....." | 2,494,740 | 15,295 | 7,485,509 | 45,612 |
| Agricultural implements— | | | | |
| Cultivators.....No. | 7,795 | 201,758 | 6,030 | 146,668 |
| Drills....." | 10,364 | 634,121 | 3,961 | 259,701 |
| Harrows....." | 7,300 | 127,482 | 6,252 | 92,556 |
| Harvesters....." | 23,194 | 2,439,319 | 19,474 | 2,015,996 |
| Hay rakes....." | 9,846 | 247,445 | 6,524 | 196,519 |
| Mowing machines....." | 24,044 | 847,253 | 21,457 | 725,831 |
| Parts of....." | | 915,142 | | 712,414 |
| Ploughs.....No. | 15,450 | 465,505 | 12,896 | 324,349 |
| Reapers....." | 5,604 | 317,716 | 3,919 | 223,228 |
| Seeders....." | | | 32 | 1,810 |
| Threshing machines....." | 1,928 | 712,270 | 1,965 | 799,307 |
| All other....." | | 503,235 | | 290,520 |
| Aluminium, in bars.....Cwt. | 130,150 | 1,762,214 | 145,108 | 2,364,907 |
| " manufactures of....." | | 8,203 | | 5,571 |
| Asbestos, manufactures of....." | | 73,446 | | 94,538 |
| Bricks.....M | 977 | 8,579 | 1,486 | 11,871 |
| Calcium carbide.....Lbs. | 5,163,577 | 153,702 | 15,447,014 | 470,387 |
| Cement....." | | 1,739 | | 2,223 |
| Clay, manufactures of....." | | 27,201 | | 26,866 |
| Coke.....Tons | 68,235 | 308,410 | 67,838 | 306,117 |
| Earthenware, and all manufactures of....." | | 16,553 | | 9,336 |
| Fertilizers....." | | 2,439,923 | | 2,390,494 |
| Grindstones, manufactured....." | | 54,867 | | 24,113 |
| Gypsum and plaster ground....." | | 5,795 | | 35,490 |
| Iron and steel:— | | | | |
| Castings, n.e.s....." | | 61,362 | | 24,218 |
| Gas buoys and parts of....." | | 35,462 | | 21,009 |
| Wire and wire nails.....Cwt. | | | 193,255 | 355,781 |
| Hardware, tools, etc....." | | 101,990 | | 95,497 |
| " n.e.s....." | | 70,767 | | 190,763 |
| Machinery (Linotype machines)....." | | 9,631 | | 5,562 |
| " n.e.s....." | | 435,333 | | 344,689 |
| Pig-iron.....Tons | 6,326 | 351,646 | 14,198 | 201,145 |
| Scrap iron and steel.....Cwt. | 911,111 | 483,813 | 708,107 | 446,337 |
| Sewing machines.....No. | 8,122 | 114,438 | 2,109 | 31,392 |
| Steel and manufactures of....." | | 1,051,004 | | 2,931,908 |
| Stoves.....No. | 1,371 | 23,858 | 4,198 | 25,149 |
| Typewriters....." | 3,048 | 201,763 | 3,055 | 200,441 |
| Vehicles— | | | | |
| Automobiles....." | 5,997 | 3,395,382 | 5,621 | 3,011,327 |
| " parts of....." | | 210,623 | | 384,428 |
| Bicycles.....No. | 90 | 8,058 | 111 | 10,021 |
| " parts of....." | | 16,901 | | 3,973 |
| Washing machines....." | | 15,872 | | 33,986 |
| Ferro-Silicon and Ferro Compounds.....Tons | | | 4,865 | 285,221 |
| Lime....." | | 29,234 | | 16,927 |
| Metals:— | | | | |
| Brass, old and scrap.....Cwt. | 32,144 | 293,572 | 21,209 | 196,710 |
| Copper....." | 24,972 | 324,903 | 19,871 | 231,710 |
| Metallic shingles, etc....." | | 119,673 | | 105,663 |
| Metals, n.o.p....." | | 399,792 | | 393,829 |
| Mineral and aerated waters (in bottles)....." | | 970 | | 1,768 |
| Naphtha and gasoline.....Gals. | 17,875 | 4,284 | 43,023 | 11,607 |
| Oil, n.o.p....." | 634,861 | 171,663 | 455,867 | 104,179 |
| Phosphorus.....Lbs. | 534,340 | 73,395 | 610,350 | 92,303 |
| Plumbago, manufactures of....." | | 24,284 | | 72,718 |
| Stone, building....." | | | | 370 |
| " ornamental....." | | 7,381 | | 1,752 |
| Tar....." | | 30,628 | | 36,719 |
| Tin, manufactures of....." | | 53,783 | | 24,531 |
| Total manufactures....." | | 20,730,707 | | 21,752,203 |
| Grand total....." | | 79,803,874 | | 75,533,305 |

EXPORTS.

Showing Destination of Mine Products during the Fiscal Years,
1911-12, 1912-13, and 1913-14.

| Destination. | 1911-12. Value. | 1912-13. Value. | 1913-14. Value. |
|--------------------------------|--------------------|--------------------|--------------------|
| <i>British Empire.</i> | \$ | \$ | \$ |
| United Kingdom..... | 5,555,599 | 12,066,622 | 16,027,128 |
| Australia and Tasmania..... | 178,260 | 73,283 | 92,457 |
| Bermuda..... | 62,494 | 5,315 | 1,192 |
| British South Africa..... | 10,460 | 33,415 | 13,863 |
| " Guiana..... | 1,492 | 37,983 | 23,351 |
| " W. Indies..... | 13,635 | 15,383 | 3,343 |
| Hong Kong..... | 434,202 | 491,121 | 1,058,229 |
| Newfoundland and Labrador..... | 618,766 | 498,989 | 649,682 |
| New Zealand..... | 1,050 | 948 | ..... |
| Total British Empire..... | 6,875,958 | 13,223,059 | 17,869,245 |
| <i>Other Countries.</i> | | | |
| Alaska..... | 305,086 | 327,325 | 102,383 |
| Argentina..... | 24,313 | 66,315 | 19,206 |
| Austria-Hungary..... | 1,410 | 32,474 | 74,200 |
| Belgium..... | 101,661 | 141,924 | 258,180 |
| Brazil..... | ..... | 54,760 | ..... |
| Chili..... | 19,669 | ..... | ..... |
| China..... | 103,904 | 511,155 | 162,034 |
| Cuba..... | 21,590 | 8,852 | 19,253 |
| Denmark..... | 448 | 877 | 365 |
| France..... | 74,487 | 114,370 | 167,974 |
| French Africa..... | ..... | 2,127 | ..... |
| Germany..... | 248,925 | 172,966 | 618,201 |
| Greece..... | ..... | ..... | 200 |
| Hayti..... | ..... | 843 | ..... |
| Holland..... | 5,260 | 27,529 | 185,158 |
| Italy..... | 4,358 | 7,430 | 16,704 |
| Japan..... | 58,773 | 54,976 | 32,626 |
| Mexico..... | 159,345 | 69,946 | ..... |
| Miquelon and St. Pierre..... | 30,205 | 47,093 | 20,476 |
| Norway..... | ..... | ..... | 100 |
| Peru..... | 3,682 | ..... | ..... |
| Philippines..... | 2,824 | ..... | ..... |
| Portugal..... | ..... | ..... | 1,322 |
| Portuguese Africa..... | 20,340 | ..... | ..... |
| Roumania..... | ..... | 4,791 | ..... |
| Russia in Europe..... | ..... | ..... | 140 |
| San Domingo..... | 1,000 | ..... | ..... |
| Spain..... | 1,471 | ..... | 10 |
| Sweden..... | ..... | ..... | 150 |
| Switzerland..... | 159 | ..... | ..... |
| United States..... | 33,259,580 | 42,541,751 | 39,491,127 |
| Uruguay..... | 68 | 31,983 | ..... |
| Total other countries..... | 34,448,558 | 44,219,487 | 41,169,809 |
| Grand total..... | 41,324,516 | 57,442,546 | 59,039,054 |

IMPORTS.

Imports of Products of the Mine and Manufactures of Mine Products
—Calendar Years 1913 and 1914.

| Products. | 1913. Value. | 1914. Value. |
|---|-----------------|-----------------|
| | \$ | \$ |
| Alumina..... | 614,713 | 571,419 |
| Alum, alum cake, and chloralum..... | 198,613 | 188,918 |
| Aluminium and manufactures..... | 745,694 | 860,351 |
| Antimony regulus..... | 49,408 | 47,498 |
| Antimony salts..... | 2,421 | 10,217 |
| Arsenic, oxide and sulphide of..... | 18,820 | 1,005 |
| Asbestos..... | 520,082 | 282,053 |
| Asphaltum..... | 905,829 | 712,980 |
| Bells and gongs..... | 130,351 | 99,898 |
| Bismuth..... | 4,940 | 3,927 |
| Blanc fixe and satin white..... | 38,043 | 39,849 |
| Blast furnace slag..... | 71,114 | 20,736 |
| Borax..... | 104,787 | 103,975 |
| Brick and tile..... | 1,928,735 | 1,296,657 |
| Brick, fire, of a kind not made in Canada, and n.o.p..... | 1,192,857 | 690,133 |
| Bromine and bromides..... | 385 | 997 |
| Burrstones..... | 1,784 | 16 |
| Cement, Portland, and manufactures..... | 427,032 | 159,691 |
| Chalk, Cornwall stone, feldspar, fluorspar, etc..... | 164,879 | 113,211 |
| Clays..... | 324,290 | 288,128 |
| Coal, anthracite, bituminous, slack, and run of mine..... | 47,949,119 | 39,801,498 |
| Coal tar and coal pitch..... | 225,765 | 198,283 |
| Coke..... | 2,180,830 | 1,585,259 |
| Coke, ground for electric batteries..... | 9,942 | 13,115 |
| Copper and manufactures of..... | 7,414,610 | 4,256,901 |
| Cryolite..... | 33,487 | 60,517 |
| Crucibles, clay or plumbago..... | 73,971 | 49,913 |
| Chloride of lime..... | 115,614 | 138,619 |
| Cyanides of potassium, sodium, cyanogen, or cpd of bromine..... | 217,472 | 309,913 |
| Diamonds, unset, and bort..... | 3,223,711 | 2,190,786 |
| Earthenware..... | 3,314,870 | 2,192,222 |
| Earths, crude..... | 9,527 | 3,992 |
| Electric carbons..... | 98,944 | 55,880 |
| Emery..... | 184,649 | 118,008 |
| Fertilizers, compound or manufactured..... | 505,904 | 677,174 |
| Flint, quartz, silix, etc..... | 74,529 | 63,433 |
| Foundry facings..... | 24,226 | 11,372 |
| Fullers earth..... | 13,190 | 12,338 |
| Fossils..... | 3,237 | 4,477 |
| Gannister..... | 1,776 | 595 |
| Gold and silver and manufactures of..... | 2,736,517 | 15,777,804 |
| Graphite and manufactures of..... | 82,262 | 50,279 |
| Grindstones..... | 145,247 | 98,872 |
| Gypsum and plaster of Paris..... | 188,252 | 75,031 |
| Hydrofluosilicic acid..... | 46,517 | 41,576 |
| Iron and steel—Total, 1913, \$145,226,792 1914, 79,762,262 | | |
| Pig-iron..... | 3,247,405 | 982,189 |
| Ferro products and chrome steel..... | 970,100 | 560,686 |
| Ingots, blooms, billets, puddled bars, etc..... | 1,212,314 | 259,703 |
| Scrap iron and scrap steel..... | 1,488,255 | 337,406 |
| Plates and sheets..... | 13,965,865 | 7,576,312 |
| Tin plates and sheets..... | 3,954,615 | 3,151,385 |
| Bars, rods, hoops, bands, etc..... | 10,195,280 | 5,138,193 |
| Structural iron and steel..... | 12,739,954 | 4,214,520 |
| Rails and connexions..... | 5,120,830 | 1,116,773 |
| Pipes and fittings..... | 847,922 | 395,466 |
| Nails and spikes..... | 360,489 | 210,098 |
| Wire..... | 3,688,660 | 3,205,635 |
| Forging castings and manufactures..... | 2,090,533 | 1,375,590 |
| Other iron and steel products..... | 85,344,750 | 51,238,306 |
| Iron ore..... | 3,877,824 | 2,387,358 |
| Iron sand..... | 10,168 | 13,743 |
| Kainite..... | 1,970 | 13,337 |
| Lead and manufactures; litharge..... | 1,215,433 | 1,042,538 |
| Lime..... | 238,271 | 211,123 |
| Lithographic stone..... | 7,152 | 4,107 |
| Manganese, oxide of..... | 46,990 | 42,287 |

IMPORTS.

Imports of Products of the Mine and Manufactures of Mine Products
Calendar Years 1913 and 1914—*Continued.*

| Products. | 1913. Value. | 1914. Value. |
|---|-----------------|-----------------|
| | \$ | \$ |
| Magnesia..... | 12,226 | 16,429 |
| Meerschäum..... | 111 | 372 |
| Mercury or quicksilver, cinnabar..... | 109,493 | 97,449 |
| Metallic alloys:— | | |
| Babbitt metal..... | 41,112 | 26,489 |
| Brass and manufactures of..... | 4,667,768 | 2,868,464 |
| Britannia metal..... | 43,417 | 33,080 |
| German silver, nickel, and nickel silver..... | 249,192 | 238,612 |
| Type metal..... | 1,981 | 1,500 |
| Mineral and bituminous substances..... | 198,519 | 146,763 |
| Mineral water, including aerated water..... | 257,153 | 199,327 |
| Nickel anodes..... | 8,512 | 12,640 |
| Ochres, etc..... | 283,554 | 278,064 |
| Ores of metals, n.o.p., cobalt ore..... | 894,989 | 574,690 |
| Paraffin wax..... | 72,351 | 57,527 |
| Paraffin candles..... | 37,546 | 44,874 |
| Petroleum and products of..... | 13,238,429 | 11,072,362 |
| Phosphate (fertilizer)..... | 16,070 | 20,220 |
| Platinum and manufactures of..... | 145,674 | 79,614 |
| Potash and manufactures of..... | 414,165 | 343,004 |
| Precious stones..... | 360,473 | 177,168 |
| Pumice..... | 17,861 | 16,976 |
| Salt..... | 565,283 | 540,881 |
| Saltpetre..... | 81,797 | 108,784 |
| Sand and gravel..... | 440,343 | 224,759 |
| Slate and manufactures of..... | 235,474 | 213,256 |
| Sand paper..... | 171,516 | 138,415 |
| Soda products: barilla, bichromate, caustic, salt, and salt cake..... | 998,993 | 960,670 |
| Stone and manufactures of (including marble)..... | 1,640,849 | 1,252,869 |
| Soda, nitrate of..... | 1,645,320 | 604,952 |
| Sulphate of iron (copperas)..... | 5,036 | 5,517 |
| Sulphur and phosphorus..... | 638,970 | 877,628 |
| Sulphuric acid..... | 4,054 | 7,149 |
| Talc..... | 10,706 | 8,983 |
| Tin and manufactures of (including tinware)..... | 3,118,760 | 2,023,329 |
| Whiting and prepared chalk..... | 151,380 | 134,511 |
| Zinc and manufactures of..... | 1,576,943 | 1,210,652 |
| | 259,299,745 | 181,374,250 |

(b) Nine months only.

METALLIC ORES AND PRODUCTS.

Antimony.—There has been no production of antimony during the past three years. The imports of antimony or regulus thereof, in 1914, were 648,516 pounds, valued at \$47,498, and of antimony salts, 45,634 pounds, valued at \$10,217, or a total value of imports of \$57,715. In 1913, the imports were antimony and regulus, 667,050 pounds, valued at \$49,408; and antimony salts, 23,649 pounds, valued at \$2,421, or a total value of imports of \$51,829.

Cobalt.—Cobalt oxide, cobalt material, and cobalt residues are being produced in Canadian smelters and reduction mills.

The production of cobalt oxide in 1914 was 899,027 pounds, valued at \$571,710, and of mixed oxides of cobalt and nickel together with cobalt residues 2,079,001 pounds, containing 242,572 pounds of metallic cobalt and valued at \$79,995. During 1913 the production of cobalt oxide was 660,079 pounds valued at \$525,028, and of mixed oxides and cobalt residues 3,216,000 pounds, containing 403,882 pounds of cobalt and valued at \$90,266.

Copper.—The production of copper contained in blister, matte, or ore, which was practically all exported, was 75,735,960 pounds in 1914, valued at \$10,301,606, as compared with 76,976,925 pounds in 1913, valued at \$11,753,606.

The exports of copper in 1914 were reported as 77,398,723 pounds, valued at \$8,270,689 as against exports in 1913 of 85,147,560 pounds, valued at \$9,927,814. The total imports of copper in 1914 were valued at \$4,256,901 and included crude and manufactured copper, 26,280,815 pounds valued at \$3,983,322, and other manufactures of copper, valued at \$273,579. In 1913 the total value of the imports was \$7,414,610 including 41,011,961 pounds of crude and manufactured copper, valued at \$6,935,822, and copper sulphate and other manufactures, valued at \$478,788.

Gold.—The total value of the production of gold in 1914 was \$15,983,007 representing 773,178 fine ounces, as compared with \$16,598,923 representing 802,973 fine ounces of metal in 1913.

The Yukon placer production in 1914 was 247,940 fine ounces, valued at \$5,125,374.

Of the total production in 1914 about \$5,687,501 were derived from alluvial workings; \$6,051,968 in bullion from milling ores, and \$4,243,538 from ores and concentrates sent to smelters. In 1913 about \$6,346,072 were derived from alluvial workings: \$5,185,544 as bullion from milling ore and \$5,067,307 from ores and concentrates sent to smelters.

The exports of gold-bearing dust, quartz, nuggets, and gold in ore, etc., in 1914 were valued at \$15,242,200, as against \$12,770,838 in 1913.

The imports of gold bullion during the calendar year 1914 were \$14,534,482, of gold coin \$117,700,824, and of manufactures of gold and silver \$614,043.

Pig-Iron.—The total production of pig-iron in Canadian blast furnaces in 1914 was 783,164 tons valued at \$10,002,856 of which it is estimated 687,420 tons valued at \$8,863,944 should be credited to imported ores, and 95,744 tons valued at \$1,138,912 to domestic ores. In 1913 the total production was 1,128,967 tons, valued at \$16,540,012, of which it is estimated 1,055,459 tons, valued at \$15,543,583, should be credited to imported ores, and 73,508 tons, valued at \$996,429, to domestic ores.

The exports of pig-iron, including ferro-products, in 1914, were 19,063 tons, valued at \$486,366, as against 6,326 tons valued at \$351,646, in 1913.

The imports of pig-iron in 1914 were 78,594 tons, valued at \$981,107; ferro-manganese, etc., 22,147 tons, valued at \$549,485, and charcoal pig-iron 86 tons, valued at \$1,082, as compared with imports in 1913 of pig-iron 235,843 tons, valued at \$3,234,877; ferro-manganese, etc., 30,355 tons, valued at \$940,443, and charcoal pig 926 tons, valued at \$12,528.

The total exports of iron and steel and manufactures thereof, in 1914 were valued at \$14,391,746, as against \$13,999,149 in 1913. The imports of iron and steel and manufactures thereof during the calendar year 1914 were valued at \$79,762,262, as compared with \$145,226,972 during the calendar year 1913.

Iron Ore.—The total shipments of iron ore from Canadian mines in 1914 were 244,854 tons, valued at \$542,041, as compared with 307,634 tons, valued at \$629,843 in 1913. The quantity of imported iron ore used in Canada in 1914 was about 1,324,326 tons, as compared with 2,110,828 tons of imported ore used in 1913.

Lead.—The production of lead in 1914 was 36,337,765 pounds, valued at \$1,627,568, as against 37,662,703 pounds, valued at \$1,754,705 in 1913. The exports of lead in 1914 were pig lead 510,573 pounds valued at \$19,507, lead in ore, etc., 246,100 pounds, valued at \$2,681; the exports in 1913 were, lead in ore, etc., 329,960 pounds, valued at \$9,136. The total value of the imports of lead and manufactures of, in 1914 was \$1,042,538, as compared with imports in 1913, valued at \$1,215,433.

Molybdenum.—There was a small production of molybdenum in 1914 equivalent to 3,814 pounds of concentrate, valued at \$2,063.

Nickel.—The production of nickel contained in nickel-copper matte produced in Canada and exported for refinement was, in 1914, 45,517,937 pounds, valued at \$13,655,381, as compared with a production of 49,676,772 pounds, valued at \$14,903,032 in 1913. During 1914 there were smelted 947,053 tons of ore, producing 46,396 tons of matte, as against 823,403 tons of ore, producing 47,150 tons of matte, in 1913. Small quantities of nickel-oxide are also produced in connexion with the treatment of the Cobalt District silver ores, the production in 1914 being 392,512 pounds, valued at \$34,883. The exports of nickel contained in ore, matte, etc., during 1914 were 46,528,327 pounds, valued at \$5,149,427; being 10,291,979 pounds

to Great Britain; 36,015,642 pounds to the United States, and 220,706 pounds to other countries.

In 1913 the exports were 49,459,017 pounds, valued at \$5,195,560; being 5,164,512 pounds to Great Britain, 44,224,119 pounds to the United States, and 70,386 pounds to other countries. The imports of nickel, nickel-silver in ingots, bars, sheets, etc., in 1914, were 619,852 pounds, valued at \$155,427, as against 592,491 pounds, valued at \$162,520 imported in 1913.

Silver.—The production of silver contained in bullion, or estimated as recovered from mattes and ores, etc., exported, was in 1914, 28,449,821 fine ounces, valued at \$15,593,631, as compared with 31,845,803 fine ounces, valued at \$19,040,924, in 1913. The exports of silver contained in ores, mattes, etc., in 1914 were 28,020,089 ounces, valued at \$15,584,813; as against exports of 37,371,569 ounces, valued at \$21,441,220, in 1913. The imports of silver bullion during the calendar year 1914 were valued at \$629,279, as compared with bullion imports of \$840,245 in 1913.

Zinc.—The shipments of zinc ore in 1914 were 10,893 tons, valued at \$262,563, as compared with shipments of 7,889 tons, valued at \$186,827. The total value of the imports of zinc and manufactures of zinc, in 1914, was \$1,210,652, as compared with imports, valued at \$1,576,943 in 1913.

NON-METALLIC PRODUCTS.

Actinolite.—A production of 119 tons, valued at \$1,304, was reported in 1914, as compared with 66 tons valued at \$720 in 1913.

Arsenic.—Smelter returns show a production in 1914 of 1,737 tons of arsenious oxide, valued at \$104,015, as compared with a production in 1913 of 1,692 tons, valued at \$101,463.

The exports of arsenic in 1914 were 1,876 tons, valued at \$132,567, as against 1,303 tons, valued at \$107,094 in 1913. The imports of sulphide of arsenic in 1914 were 11,494 pounds, valued at \$756 as against 455,394 pounds, valued at \$17,759 in 1913.

Asbestos.—The shipments of asbestos in 1914 were 96,542 tons, valued at \$2,892,266, and of asbestic 21,031 tons, valued at \$17,540.

The shipments in 1913 were, of asbestos, 136,951 tons, valued at \$3,830,909, and of asbestic, 24,135 tons, valued at \$19,016. The shipments in 1914 consisted of 4147.9 tons of crude asbestos, valued at \$773,193, and 92,394 tons of mill stock, valued at \$2,119,073. Considerable quantities both of crude and of mill stock were held in manufacturers' hands at the close of the year.

Exports in 1914 were 81,081 tons, valued at \$2,298,646, as against 103,812 tons, valued at \$2,848,047 in 1913. There was also exported in 1914, 18,991 tons of asbestic sand, valued at \$108,548.

Imports of asbestos and manufactures of asbestos in 1914 were valued at \$282,053, and in 1913, \$520,082.

Chromite.—There was a small shipment of chromite in 1914 amounting to 136 tons, valued at \$1,210.

Coal.—The production of coal in 1914 was 13,637,529 tons, valued at \$33,471,801, as against 15,012,178 tons, valued at \$37,334,940 in 1913.

The exports of coal in 1914 were 1,423,126 tons, valued at \$3,880,175, as compared with 1,562,020 tons, valued at \$3,961,351, in 1913. The total imports of coal in 1914 were 14,721,057 tons, valued at \$39,801,498, as against imports in 1913 of 18,201,953 tons, valued at \$47,949,119.

The 1912 imports included 7,776,415 tons of bituminous round and run of mine coal, valued at \$14,954,321; 4,435,010 tons of anthracite and anthracite dust, valued at \$21,241,924; and 2,509,632 tons of bituminous slack, such as will pass through a $\frac{3}{4}$ " screen, valued at \$3,605,253. The consumption of coal in 1914 was approximately 26,852,323 tons, as against 31,582,545 tons in 1913.

The 1913 imports included 10,743,473 tons of bituminous round and run of mine coal, valued at \$21,756,658; 4,642,057 tons of anthracite and anthracite dust, valued at \$22,034,839; and of bituminous slack, such as will pass through a $\frac{3}{4}$ " screen, 2,816,423 tons, valued at \$4,157,622.

Coke.—The total quantity of oven coke made in 1914 was 1,015,253 tons, the quantity sold or used was 1,023,860 tons, valued at \$3,658,514, as compared with 1,517,133 tons made, in 1913, and 1,530,499 tons sold or used, valued at \$5,919,596. The quantity of coal charged to coke ovens in 1914 was 1,541,913 tons, as compared with 1,541,547 tons in 1913. The exports of coke in 1914 were 67,838 tons, valued at \$306,117, and in 1913 68,235 tons, valued at \$308,410.

The imports of coke in 1914 were 553,046 tons, valued at \$1,585,259, as compared with imports of 723,906 tons, valued at \$2,180,830 in 1913.

Corundum.—The total sales of grain corundum in 1914 were 548 tons, valued at \$72,176, as compared with sales of 1,177 tons, valued at \$137,036 in 1913. Exports for 1914 were 947 tons, valued at \$87,740.

Feldspar.—Shipments of feldspar in 1914 were 18,060 tons, valued at \$70,824, as compared with 16,790 tons, valued at \$60,795 in 1913. The exports are recorded as 18,072 tons, valued at \$74,100, in 1914, and 15,996 tons, valued at \$62,767 in 1913.

Fluorspar.—No production has been reported during the past two years. Canadian furnaces in 1914 used 8,845 tons of fluorspar. Imports of hydrofluosilicic acid were 1,384,087 pounds, valued at \$41,576.

Graphite.—Shipments of crude and milled graphite during 1914 totalled 1,647 tons, valued at \$107,203, as against 2,162 tons, valued at \$90,282 in 1913. The production of artificial graphite in 1914 was reported as 617 tons, as compared with 1,092 tons in 1913.

Exports of plumbago in 1914 are reported as 919 tons, valued at \$50,528, and manufactures of plumbago, valued at \$72,718. Exports in 1913 were:

plumbago 1,642 tons, valued at \$85,368, and manufactures of plumbago valued at \$24,284.

Imports of graphite in 1914 were valued at \$100,192, and included: plumbago not ground \$801; blacklead \$6,798; plumbago ground and manufactures of, \$42,680; and crucibles of clay or plumbago \$49,913. In 1913 the imports were valued at \$156,233, and included: plumbago not ground \$9,375; blacklead \$8,633; plumbago ground and manufactures of, \$64,254; and crucibles of clay or plumbago, \$73,971.

Grindstones.—The production of grindstones, scythestones, and wood pulpstones, in 1914 was 3,976 tons, valued at \$54,504, as compared with 4,837 tons, valued at \$51,325 in 1913. The exports in 1914 were: manufactured grindstones valued at \$24,113, and stone for the manufacture of grindstones 54 tons, valued at \$294. The exports in 1913 were: manufactured grindstones, valued at \$54,867. The imports of abrasives in 1914 included: grindstones valued at \$98,872; burrstones \$16; emery in bulk, crushed or ground \$29,127; manufactures of emery, carborundum, etc., \$88,881; pumice stone \$16,976; also iron sand, \$13,743; sandpaper \$138,415. The 1913 imports comprised: grindstones, valued at \$145,247; burrstones \$1,784; emery in bulk, crushed or ground \$48,995; manufactures of emery, carborundum, etc., \$135,654; pumice stone, \$17,861; also iron sand \$10,168; sandpaper, \$171,516.

Gypsum.—The total shipments of gypsum, crude and calcined, in 1914, were 516,880 tons, valued at \$1,156,507, as compared with shipments of 636,370 tons, valued at \$1,447,739 in 1913. The tonnage of gypsum mined or quarried in 1914 was 579,841, and the quantity calcined 138,212 tons.

In 1913, 684,726 tons of gypsum were mined or quarried, and 147,532 tons calcined. The shipments in 1914 included: crude lump 351,729 tons, valued at \$400,521; crude crushed 49,441 tons, valued at \$61,686; fine ground 6,097 tons, valued at \$14,496; and calcined gypsum 109,613 tons, valued at \$679,504. The shipments in 1913 included: crude gypsum 499,460 tons, valued at \$615,493; ground gypsum 10,281 tons, valued at \$20,576; and calcined gypsum 126,629 tons, valued at \$811,670.

The exports of gypsum in 1914 were: 345,830 tons of crude gypsum, valued at \$404,234, and gypsum ground or calcined, valued at \$35,490. The 1913 exports were 417,302 tons of crude gypsum, valued at \$504,383, and gypsum ground, or calcined, valued at \$5,795.

The imports of gypsum in 1914 were valued at \$75,031, and included: crude gypsum, 3,572 tons, valued at \$16,448; ground gypsum, 536 tons, valued at \$4,301; and plaster of Paris, 7,739 tons, valued at \$54,282.

The imports of gypsum in 1913 were valued at \$188,252, including: crude gypsum, 4,522 tons, valued at \$21,763; ground gypsum 2,496 tons, valued at \$11,770; and plaster of Paris 20,113 tons, valued at \$154,719.

Magnesite.—Shipments of magnesite in 1914 were 358 tons, valued at \$2,240, and in 1913, 515 tons, valued at \$3,335. Imports of magnesia in 1914 were 254,283 pounds, valued at \$16,429.

Manganese.—Shipments of manganese in 1914 were reported as 28 tons, valued at \$1,120. The exports in 1914 were 30 tons, valued at \$750, as against exports in 1913 of 8 tons, valued at \$303. The 1914 imports included 1,702 tons of manganese oxide, valued at \$42,287, as compared with 2,588 tons, valued at \$46,990 in 1913.

Mica.—The value of the mica production in 1914, as reported by mine operators, was \$109,061, as compared with \$194,304 in 1913. The exports of mica in 1914 were 669,163 pounds, valued at \$178,940, as against 817,152 pounds, valued at \$240,775 in 1913.

Mineral Pigments.—Shipments of barytes in 1914 were 612 tons, valued at \$6,169, as against 641 tons, valued at \$6,410 in 1913. The production of ochres, iron oxides, in 1914 was 5,890 tons, valued at \$51,725, as compared with 5,987 tons, valued at \$41,774 in 1913.

The exports of iron oxides in 1914 were 1,777 tons, valued at \$22,311, as against 1,956 tons, valued at \$18,931 in 1913. The imports in 1914 were: ochres and ochrey earth and raw siennas, 1,532 tons, valued at \$33,197; and oxides, dry fillers, fireproof umbers, and burnt siennas 4,023 tons, valued at \$244,867, as compared with imports in 1913, comprising: ochres and ochrey earth and raw siennas 1,663 tons, valued at \$43,119; and oxides, dry fillers, fireproof umbers, and burnt siennas 4,387 tons, valued at \$240,435.

Mineral Water.—The value of the production of mineral water in 1914 for which returns were received was \$134,111, as compared with a value of \$173,677 in 1913. The imports of mineral and aerated waters in 1914 were valued at \$199,153, as against a value of \$257,153, in 1913. The exports in 1914 were valued at \$1,367, as against \$1,496 in 1913.

Natural Gas.—The production of natural gas in 1914 was 21,693 million cubic feet, valued at \$3,484,727, as compared with 20,478 million cubic feet, valued at \$3,309,381 in 1913.

Peat.—Shipments of peat for fuel purposes in 1914 were 685 tons, valued at \$2,470, as compared with 2,600 tons, valued at \$10,100 in 1913.

Petroleum.—The production of crude petroleum shows a further falling off in 1914, the production being 214,805 barrels, or 7,518,168 gallons, valued at \$343,124; as compared with 228,080 barrels, or 7,982,798 gallons, valued at \$406,439 in 1913.

Exports of refined oil in 1914 were 2,922 gallons, valued at \$826, and 24,273 gallons, valued at \$3,188 in 1913. There was an export in 1914 of naphtha and gasoline of 43,023 gallons, valued at \$11,607, crude mineral oil 3,996 gallons, valued at \$362, and also an export of other oils n.e.s., of 455,867 gallons, valued at \$104,179, which may have included products of petroleum.

While the production has been decreasing the imports have been increasing; the total imports of petroleum oils, crude and refined in 1914 were 224,487,973 gallons, valued at \$11,072,362, and 1,594,236 pounds of paraffin wax and candles, valued at \$102,401. The oil imports included; crude oil 195,207,210 gallons, valued at \$5,750,971; refined and illuminating oils 12,833,065 gallons, valued at \$970,481; gasoline 24,396,401 gallons, valued at \$2,744,368; lubricating oils 5,767,676 gallons, valued at \$940,143, and other petroleum products 6,283,621 gallons, valued at \$663,407.

The total imports in 1913 were 222,779,028 gallons, valued at \$13,238,429, in addition to 1,628,837 pounds of paraffin wax and candles, valued at \$109,897. The oil imports included: crude oil 162,061,926 gallons, valued at \$5,250,835; refined and illuminating oils 19,393,627 gallons, valued at \$1,394,440; gasoline 29,525,180 gallons, valued at \$4,822,941; lubricating oils 6,789,451 gallons, valued at \$1,172,986, and other petroleum products 5,008,844 gallons, valued at \$597,227.

Phosphate.—Shipments of phosphate or apatite in 1914 were 954 tons, valued at \$7,275, as compared with 385 tons, valued at \$3,643 in 1913. Exports in 1914 were reported as 247 tons valued at \$677. There was an export of phosphorus in 1914 of 610,350 pounds, valued at \$92,303, while in 1913, 5,343,340 pounds, valued at \$73,395 were exported. The imports of phosphate rock (fertilizer) in 1914 were valued at \$20,220; phosphorus 20,994 pounds valued at \$6,760, and manufactured fertilizers valued at \$677,174. The imports in 1913 included rock (fertilizer) valued at \$16,070; phosphorus 17,600 pounds, valued at \$5,856; and manufactured fertilizers valued at \$505,904.

Pyrites.—The production of pyrites in 1914 was 228,314 tons, valued at \$744,508, as compared with 158,566 tons, valued at \$521,181 in 1913. The exports in 1914 were 89,999 tons, valued at \$377,985, as against exports of 46,066 tons, valued at \$211,640 in 1913. The imports of brimstone or sulphur in 1914 were 41,954 tons, valued at \$870,868, as against 30,433 tons, valued at \$633,114 in 1913.

Quartz.—The production of quartz in 1914 was reported as 54,148 tons, valued at \$84,583, as compared with a production in 1913 of 78,261 tons, valued at \$169,842. There were imported during 1914, 870 tons of silex of crystallized quartz, valued at \$15,502, and 3,835 tons of flint, valued at \$47,931; and in 1913, 690 tons of silex, valued at \$13,811, and 6,708 tons of flint, valued at \$60,718.

Salt.—The total sales of salt in 1914 were 107,038 tons, valued at \$493,648, (exclusive of packages). The value of the packages used was \$278,897. In 1913 the sales were 100,791 tons, valued at \$491,280, and value of packages used \$262,479.

Exports of salt in 1914 were 952,700 pounds, valued at \$5,229, and in 1913, 460,900 pounds, valued at \$3,047. The total imports of salt in 1914 were valued at \$540,881, and included: 33,893 tons, valued at \$151,108,

subject to duty; and 108,753 tons, valued at \$389,773, duty free. The 1913 imports were valued at \$565,283, and included: 31,508 tons, valued at \$147,775, subject to duty; and 112,939 tons, valued at \$417,508, duty free.

Among the imports of soda products in 1914 are included: soda ash or barilla 59,508,897 pounds, valued at \$392,559, soda bichromate 583,467 pounds, valued at \$27,998; caustic soda in packages of 25 pounds or more, 18,436,827 pounds, valued at \$314,278; sal soda 9,519,177 pounds, valued at \$55,502; nitrate of soda or cubic nitre 27,565,027 pounds, valued at \$604,952, and sulphate of soda 38,175,604 pounds, valued at \$170,333.

Talc.—The production of talc in 1914 was 10,808 tons, valued at \$40,418 as against 12,250 tons, valued at \$45,980 in 1913. Imports of talc for the calendar year 1914 were 584 tons, valued at \$8,983.

Tripolite.—There were 650 tons of tripolite, valued at \$13,000, shipped in 1914.

STRUCTURAL MATERIALS AND CLAY PRODUCTS.

Cement.—The total sales of cement in 1914 were 7,172,480 barrels, valued at \$9,187,924, as against 8,658,805 barrels, valued at \$11,019,418 in 1913. The exports of cement in 1914 were valued at \$2,223, as compared with exports valued at \$1,730, in 1913.

The imports of cement in 1914 included: manufactures of cement valued at \$12,533; and Portland cement 343,076 hundredweight, (98,022 barrels) valued at \$147,158. The imports in 1913 included: manufactures of cement, valued at \$17,729; and Portland cement 889,324 hundredweight (254,093 barrels), valued at \$409,303. The consumption of Portland cement in Canada in 1914 was approximately 7,270,502 barrels, as compared with 8,912,898 barrels in 1913.

Clay Products.—The total value of the production of clay products in Canada in 1914 was \$6,871,957, as compared with a total value of \$9,504,314 in 1913. Brick and tile products alone were valued at \$5,208,976, as against \$7,805,750 in 1913. The value of sewerpipe production in 1914 was \$1,104,499, as compared with \$1,035,906 in 1913.

The only clay products exported in 1914 were 1,486,000 building brick, valued at \$11,871; manufactures of clay valued at \$26,866, and earthenware valued at \$9,336, against 977,000 building brick, valued at \$8,579; manufactures of clay, valued at \$8,493, and earthenware valued at \$16,553 in 1913. The total imports of clay products in 1914 were valued at \$4,467,140, and included: brick and tile valued at \$1,986,790; earthenware and chinaware \$2,192,222; and clays valued at \$288,128. The total imports in 1913 were valued at \$6,760,752, and included: brick and tile valued at \$3,121,592; earthenware and chinaware \$3,314,870, and clays valued at \$324,290.

Kaolin.—In 1914 a shipment of 1,000 tons valued at \$10,000 was reported, as compared with shipments in 1913 of 500 tons valued at \$5,000.

Lime.—The total production of lime in 1914 was 7,028,582 bushels, valued at \$1,360,628, as compared with 7,558,484 bushels, valued at \$1,609,398 in 1913. The exports of lime in 1914 were valued at \$16,927, as against exports valued at \$29,234 in 1913. The imports of lime in 1914 were 340,829 barrels, valued at \$211,123, and in 1913, 386,693 barrels, valued at \$238,271.

Sand-Lime Brick.—The total sales of sand-lime brick in 1914 were 70,650,030, valued at \$609,515, an average value of \$8.63 per thousand. The sales in 1913 were 92,586,676, valued at \$906,665, an average value of \$9.79 per thousand.

Slate.—The production of slate in 1914 was 1,075 squares, valued at \$4,837, and 1,432 squares, valued at \$6,444 in 1913. The imports of slate in 1914 were valued at \$213,256, and included: roofing slate valued at \$91,977; school writing slate \$54,723; slate pencils \$6,514; and manufactures of slate \$59,444. The imports in 1913 were valued at \$235,474, and included roofing slate valued at \$97,730; school writing slate, \$51,953; slate pencils \$9,166, and manufactures of slate, \$76,625.

Stone.—The total value of the production of stone of all kinds in 1914 was \$5,469,056, as compared with a value of \$5,504,639 in 1913. The value of stone exports in 1914 was \$72,080, as against \$93,840 in 1913; and the total value of stone imported in 1914 was \$1,252,869, as against imports valued at \$1,640,849 in 1913.

The production in 1914 included: granite valued at \$2,176,602; limestone \$2,672,781; marble \$132,533, and sandstone \$487,140.

The production in 1913 included: granite, valued at \$1,653,791; limestone \$3,204,091; marble \$249,975, and sandstone \$396,782.

Sand and Gravel.—According to returns received, the production of sand and gravel in 1914 was valued at \$2,505,310, as compared with \$2,258,874 in 1913.

The exports of sand and gravel in 1914 were 952,370 tons, valued at \$802,358, and the imports 273,812 tons, valued at \$224,759.

PRODUCTION BY PROVINCES.

A summary of the mineral production by provinces in 1913 and 1914 is shown in the accompanying tables, in the first of which the total production in the several provinces and the percentages of each, are given for the past three years. Ontario continues as the largest contributor to the total, having a production of \$53,034,677, or 41.1 per cent, as against \$59,167,749, or 40.6 per cent of the total in 1913. British Columbia was second, with a production of \$24,164,039 or 18.7 per cent of the total, as against \$28,086,312 or 19.3 per cent of the total in the previous year. Nova Scotia, third in importance, had a production of \$17,584,639 or 13.6 per cent of the total in 1914, as against \$19,376,183, or 13.3 per cent of the total in 1913. Alberta, in fourth place, had a production of \$12,684,234,

or 9·8 per cent; Quebec occupied fifth place, with a production of \$11,836,929 or 9·2 per cent. The Yukon District, Manitoba, New Brunswick, and Saskatchewan, follow in the order named.

In making these comparisons it should be remembered that Nova Scotia is not credited with the large production of pig-iron and steel at Sydney and Sydney Mines, which is made almost entirely from imported iron ores and is not naturally credited as Canadian mine product. Similarly a large proportion of the pig-iron production in Ontario is excluded from the total value, because it is derived from imported ores. The Province of Quebec also, is not credited with the production of aluminium at Shawenegan Falls, which is made from imported bauxite.

Mineral Production by Provinces, 1912, 1913, and 1914.

| Province. | 1912. | | 1913. | | 1914. | |
|-----------------------|----------------------------|-------------------------|----------------------------|-------------------------|----------------------------|-------------------------|
| | Value of production. \$ | Per cent of total. % | Value of production. \$ | Per cent of total. % | Value of production. \$ | Per cent of total. % |
| *Nova Scotia..... | 18,922,236 | 14·01 | 19,376,183 | 13·30 | 17,584,639 | 13·65 |
| New Brunswick..... | 771,004 | 0·57 | 1,102,613 | 0·76 | 1,014,570 | 0·79 |
| Quebec..... | 11,656,998 | 8·63 | 13,475,534 | 9·25 | 11,836,929 | 9·19 |
| Ontario..... | 51,985,876 | 38·50 | 59,167,749 | 40·63 | 53,034,677 | 41·16 |
| Manitoba..... | 2,463,074 | 1·83 | 2,214,496 | 1·52 | 2,413,489 | 1·87 |
| Saskatchewan..... | 1,163,642 | 0·86 | 881,142 | 0·60 | 712,313 | 0·55 |
| Alberta..... | 12,073,589 | 8·94 | 15,054,046 | 10·34 | 12,684,234 | 9·84 |
| British Columbia..... | 30,076,635 | 22·27 | 28,086,312 | 19·29 | 24,164,039 | 18·75 |
| Yukon..... | 5,933,242 | 4·39 | 6,276,737 | 4·31 | 5,418,185 | 4·20 |
| Dominion..... | 135,048,296 | 100·00 | 145,634,812 | 100·00 | 128,863,075 | 100·00 |

*Includes a small production of lime from Prince Edward Island.

Mineral Production of Nova Scotia, 1913 and 1914.

| Product. | 1913. | | 1914. | |
|-------------------------------------|-----------|------------|-----------|------------|
| | Quantity. | Value. | Quantity. | Value. |
| | | \$ | | \$ |
| Gold..... Ozs. | 2,174 | 44,935 | 2,904 | 60,031 |
| Iron ore sold for export..... Tons. | 20,436 | 21,049 | | |
| Pig-iron from Canadian ore*..... " | 2,617 | 39,255 | | |
| Barytes..... " | 641 | 6,410 | 612 | 6,169 |
| Coal..... " | 7,980,073 | 17,812,663 | 7,370,924 | 16,452,955 |
| Grindstones..... " | 350 | 4,900 | 350 | 5,270 |
| Gypsum..... " | 404,801 | 479,515 | 303,155 | 368,931 |
| Manganese..... " | | | 28 | 1,120 |
| Tripolite..... " | 620 | 12,138 | 650 | 13,000 |
| Clay products..... " | | 332,272 | | 266,204 |
| Lime..... Bus. | 854,812 | 171,339 | 517,722 | 103,748 |
| Stone..... " | | 350,511 | | 221,090 |
| Other products..... " | | 101,196 | | 86,121 |
| Total..... | | 19,376,183 | | 17,584,639 |

*The total production of pig-iron in Nova Scotia in 1913 was 480,068 tons valued at \$7,201,020 and in 1914, 227,052 tons valued at 2,951,676.

Mineral Production of New Brunswick, 1913 and 1914.

| Product. | 1913. | | 1914. | |
|------------------------------------|-----------|-----------|-----------|-----------|
| | Quantity. | Value. | Quantity. | Value. |
| | | \$ | | \$ |
| Iron ore sold for export .....Tons | 80,941 | 144,537 | 4,775 | 10,841 |
| Coal....." | 70,311 | 166,637 | 98,049 | 241,075 |
| Grindstones....." | 4,487 | 46,425 | 3,626 | 49,234 |
| Gypsum....." | 103,954 | 279,395 | 79,083 | 200,680 |
| Natural gas.....M cu. ft | 828,603 | *174,147 | 425,826 | 54,240 |
| Petroleum.....Bls. | 2,111 | 3,762 | 1,725 | 2,742 |
| Clay products..... | 62,269 | ..... | ..... | 66,502 |
| Lime.....Bus. | 392,985 | 98,841 | 391,739 | 102,980 |
| Stone..... | ..... | 103,732 | ..... | 261,172 |
| Other products..... | ..... | 22,868 | ..... | 25,095 |
| Total..... | ..... | 1,102,613 | ..... | 1,014,570 |

* The value of natural gas sold in 1913 should have been recorded as \$67,197 instead of \$174,147.

Mineral Production of Quebec, 1913 and 1914.

| Product. | 1913. | | 1914. | |
|-----------------------------------|-----------|------------|-----------|------------|
| | Quantity. | Value. | Quantity. | Value. |
| | | \$ | | \$ |
| Copper.....Lbs. | 3,455,887 | 527,679 | 4,201,497 | 571,488 |
| Gold.....Ozs. | 701 | 14,491 | 1,292 | 26,708 |
| Iron ore sold for export.....Tons | 5,102 | 26,999 | ..... | ..... |
| Silver.....Ozs. | 34,573 | 20,672 | 57,737 | 31,646 |
| Zinc ore.....Tons | 335 | 6,700 | 969 | 10,017 |
| Asbestos and asbestic....." | 161,086 | 3,849,925 | 117,573 | 2,909,806 |
| Chromite....." | ..... | ..... | 136 | 1,210 |
| Feldspar....." | 74 | 1,554 | 98 | 2,156 |
| Graphite....." | 103 | 9,620 | 261 | 18,886 |
| Magnesite....." | 515 | 3,335 | 358 | 2,240 |
| Mica....." | 626 | 125,488 | 246 | 62,794 |
| Mineral water.....Gals. | ..... | 30,805 | ..... | 16,566 |
| Ochres, iron oxides.....Tons | 5,987 | 41,774 | 5,890 | 51,725 |
| Peat....." | 2,000 | 8,000 | ..... | ..... |
| Phosphate....." | 385 | 3,643 | 554 | 4,875 |
| Pyrites....." | 87,314 | 349,256 | 117,698 | 470,792 |
| Quartz....." | 1,008 | 2,000 | 847 | 847 |
| Cement.....Bls. | 2,940,211 | 3,430,023 | 2,846,061 | 3,331,601 |
| Clay products..... | ..... | 1,601,816 | ..... | 1,257,700 |
| Kaolin.....Tons | 500 | 5,000 | 1,000 | 10,000 |
| Lime.....Bus. | 1,616,446 | 418,008 | 1,767,935 | 389,064 |
| Slate.....Squares | 1,432 | 6,444 | 1,075 | 4,837 |
| Stone..... | ..... | 2,329,461 | ..... | 2,286,078 |
| Other products..... | ..... | 662,841 | ..... | 375,893 |
| Total..... | ..... | 13,475,534 | ..... | 11,836,929 |

There was also in this Province an important production of aluminium from imported ores.

Mineral Production of Ontario, 1913 and 1914.

| Product. | 1913. | | 1914. | |
|---|------------|------------|------------|------------|
| | Quantity. | Value. | Quantity. | Value. |
| | | \$ | | \$ |
| Cobalt oxide.....Lbs. | 660,079 | 525,028 | 889,027 | 571,710 |
| Cobalt-nickel residues, mixed cobalt and nickel oxides....." | 25,885,929 | 90,266 | 28,948,211 | 79,995 |
| Copper....." | 219,801 | 3,952,522 | 268,264 | 3,937,536 |
| Gold.....Ozs. | 110,135 | 4,543,690 | 55,635 | 5,545,509 |
| Iron ore, sold for export.....Tons | 70,889 | 237,976 | 95,744 | 124,459 |
| Iron, pig, from Canadian ore (a)....." | 33,000 | 957,174 | 1,138,912 | 1,138,912 |
| Lead.....Lbs. | | 1,537 | | |
| Molybdenum ore.....Lbs. | | | | 1,500 |
| Nickel.....Lbs. | 49,676,772 | 14,903,032 | 45,517,937 | 13,655,381 |
| Nickel oxide....." | 268,304 | 80,561 | 392,512 | 34,883 |
| Silver.....Ozs. | 28,411,261 | 16,987,377 | 25,139,214 | 13,779,055 |
| Actinolite.....Tons | 66 | 720 | 119 | 1,304 |
| Arsenious oxide....." | 1,692 | 101,463 | 1,737 | 104,015 |
| Corundum....." | 1,177 | 137,036 | 548 | 72,176 |
| Feldspar....." | 16,716 | 59,241 | 17,962 | 68,668 |
| Fluorspar....." | | | 400 | 2,400 |
| Graphite....." | 2,059 | 80,662 | 1,386 | 88,317 |
| Gypsum....." | 62,315 | 208,029 | 81,219 | 204,033 |
| Mica....." | 478 | 68,816 | 349 | 46,267 |
| Mineral water..... | | 138,072 | | 115,215 |
| Natural gas.....M. cu. ft. | 12,474,745 | 2,055,768 | 14,094,521 | 2,215,808 |
| Peat.....Tons | 600 | 2,100 | 685 | 2,470 |
| Petroleum.....Bls. | 225,969 | 402,677 | 212,693 | 338,182 |
| Pyrites.....Tons | 71,252 | 171,925 | 110,616 | 273,716 |
| Quartz....." | 77,253 | 167,842 | 52,947 | 83,628 |
| Salt....." | 100,791 | 491,280 | 107,038 | 493,648 |
| Talc....." | 12,250 | 45,980 | 10,808 | 40,418 |
| Cement.....Bls. | 3,992,988 | 4,311,183 | 2,775,142 | 3,062,129 |
| Clay products..... | | 5,220,467 | | 3,979,606 |
| Lime.....Bus. | 3,254,482 | 573,209 | 3,393,078 | 556,850 |
| Sand-lime brick.....No. | 48,211,502 | 420,177 | 43,804,995 | 329,403 |
| Stone..... | | 1,593,168 | | 1,253,849 |
| Other products..... | | 638,771 | | 833,635 |
| Total..... | | 59,167,749 | | 53,034,677 |

(a) The total production of pig-iron in Ontario in 1913 was 648,899 tons, valued at \$9,338,992; in 1914, 556,112 tons, valued at \$7,051,180.

Mineral Production of Manitoba, 1913 and 1914.

| Product. | 1913. | | 1914. | |
|--------------------------|------------|-----------|------------|-----------|
| | Quantity. | Value. | Quantity. | Value. |
| | | \$ | | \$ |
| Calcined gypsum.....Tons | 65,100 | 479,500 | 53,423 | 382,563 |
| Clay products..... | | 514,358 | | 317,488 |
| Lime.....Bus. | 576,938 | 107,281 | 526,167 | 92,898 |
| Cement.....Bls. | 179,342 | 326,856 | 402,131 | 737,046 |
| Sand-lime brick.....No. | 19,619,555 | 198,878 | 19,200,809 | 207,501 |
| Stone..... | | 389,904 | | 361,912 |
| Other products..... | | 197,719 | | 314,081 |
| Total..... | | 2,214,496 | | 2,413,489 |

Mineral Production of Saskatchewan, 1913 and 1914.

| Product. | 1913. | | 1914. | |
|-------------------------|-----------|------------|-----------|------------|
| | Quantity. | Value. | Quantity. | Value. |
| Coal.....Tons | 212,897 | \$ 358,192 | 232,299 | \$ 374,245 |
| Clay products..... | | 189,820 | | 98,349 |
| Lime.....Bus. | 35,000 | 10,000 | | |
| Sand-lime brick.....No. | 7,290,714 | 86,753 | 1,550,000 | 17,700 |
| Other products..... | | 236,377 | | 222,019 |
| Total..... | | 881,142 | | 712,313 |

Mineral Production of Alberta, 1913 and 1914.

| Products. | 1913. | | 1914. | |
|--------------------------|------------|------------|-----------|------------|
| | Quantity. | Value. | Quantity. | Value. |
| Gold.....Ozs. | | \$ | 48 | \$ 992 |
| Coal.....Tons | 4,014,755 | 10,418,941 | 3,683,015 | 9,350,392 |
| Natural gas.....M.cu.ft. | 7,174,490 | 1,079,466 | 7,172,157 | 1,214,670 |
| Cement.....Bls. | 956,169 | 1,947,933 | 641,395 | 1,212,342 |
| Clay products..... | | 893,408 | | 462,199 |
| Lime.....Bus. | 465,250 | 115,355 | 280,252 | 58,321 |
| Sand-lime brick.....No. | 15,464,905 | 176,794 | 5,453,000 | 49,731 |
| Stone..... | | 156,984 | | 60,272 |
| Other products..... | | 265,165 | | 275,315 |
| Total..... | | 15,054,046 | | 12,684,234 |

Mineral Production of British Columbia, 1913 and 1914.

| Product. | 1913. | | 1914. | |
|-------------------------|------------|--------------|------------|--------------|
| | Quantity. | Value. | Quantity. | Value. |
| Copper (a).....Lbs. | 45,791,579 | \$ 6,991,916 | 41,219,202 | \$ 5,606,636 |
| Gold.....Ozs. | 297,459 | 6,149,027 | 252,730 | 5,224,393 |
| Lead.....Lbs. | 37,626,899 | 1,753,037 | 36,289,845 | 1,625,422 |
| Platinum.....Crude ozs. | 18 | 489 | | |
| Silver.....Ozs. | 3,312,343 | 1,980,483 | 3,159,897 | 1,731,971 |
| Zinc ore..... | 7,554 | 180,127 | 9,924 | 252,546 |
| Coal.....Tons | 2,714,420 | 8,482,562 | 2,239,799 | 6,999,374 |
| Gypsum....." | 200 | 1,300 | | |
| Mineral water..... | | 4,800 | | 2,330 |
| Cement.....Bls. | 574,258 | 980,560 | 491,151 | 833,606 |
| Clay products..... | | 684,904 | | 413,909 |
| Lime.....Bus. | 362,571 | 115,365 | 151,689 | 56,767 |
| Stone..... | | 580,879 | | 1,024,683 |
| Other products..... | | 180,863 | | 392,402 |
| Total..... | | 28,086,312 | | 24,164,039 |

(a) Smelter recoveries of copper.

Mineral Production of Yukon, 1913 and 1914.

| Product. | 1913. | | 1914. | |
|-----------------|-----------|-----------|-----------|-----------|
| | Quantity. | Value. | Quantity. | Value. |
| | | \$ | | \$ |
| Copper.....Lbs. | 1,843,530 | 281,489 | 1,367,050 | 185,946 |
| Gold.....Ozs. | 282,838 | 5,846,780 | 247,940 | 5,125,374 |
| Lead.....Lbs. | 2,804 | 131 | 47,920 | 2,146 |
| Silver.....Ozs. | 87,626 | 52,392 | 92,973 | 50,959 |
| Coal.....Tons | 19,722 | 95,945 | 13,443 | 53,760 |
| Total..... | | 6,276,737 | | 5,418,185 |

Mineral Production by Provinces, 1899-1914.

| Calendar Year | Nova Scotia.* | New Brunswick. | Quebec. | Ontario. | Manitoba. | Alberta. | Saskatchew- an. | Yukon. | British Columbia. | Total. |
|---------------|---------------|----------------|------------|------------|-----------|------------|--------------------|-----------|-------------------|-------------|
| | \$ | \$ | \$ | \$ | \$ | \$ | \$ | \$ | \$ | \$ |
| 1899..... | 6,817,274 | 420,227 | 2,585,635 | 9,810,557 | | 17,108,707 | | | 12,482,605 | 49,234,005 |
| 1900..... | 9,298,479 | 439,060 | 3,202,883 | 11,558,099 | | 23,452,330 | | | 16,680,526 | 64,420,877 |
| 1901..... | 7,770,159 | 467,985 | 3,759,284 | 13,970,010 | | 19,297,940 | | | 20,531,833 | 65,797,911 |
| 1902..... | 10,686,549 | 607,129 | 3,743,038 | 14,619,091 | | 16,127,400 | | | 17,448,031 | 63,231,836 |
| 1903..... | 11,431,914 | 580,495 | 3,583,938 | 14,160,033 | | 14,082,986 | | | 17,899,147 | 61,740,513 |
| 1904..... | 11,212,746 | 559,913 | 3,688,485 | 12,882,843 | | 12,713,613 | | | 19,325,174 | 60,082,771 |
| 1905..... | 11,507,047 | 559,035 | 4,405,072 | 18,855,292 | | 11,387,642 | | | 22,386,008 | 69,078,999 |
| 1906..... | 12,894,303 | 646,328 | 5,242,058 | 25,111,682 | | 10,092,726 | | | 25,299,600 | 79,286,697 |
| 1907..... | 14,532,040 | 664,467 | 6,205,553 | 30,381,638 | 898,775 | 4,657,524 | 533,251 | 3,335,898 | 25,656,056 | 86,865,202 |
| 1908..... | 14,487,108 | 579,816 | 6,372,049 | 30,623,517 | 884,374 | 5,122,505 | 413,212 | 3,669,290 | 23,704,035 | 85,557,101 |
| 1909..... | 12,504,810 | 657,035 | 7,086,265 | 37,524,517 | 1,193,377 | 6,047,447 | 456,246 | 4,032,678 | 22,479,006 | 91,831,441 |
| 1910..... | 14,195,730 | 581,942 | 8,270,137 | 45,538,078 | 1,500,559 | 8,996,210 | 498,122 | 4,764,474 | 24,478,572 | 106,823,623 |
| 1911..... | 15,409,397 | 612,830 | 9,304,717 | 45,586,062 | 1,791,772 | 6,662,673 | 636,706 | 4,707,432 | 21,299,305 | 103,220,994 |
| 1912..... | 18,922,236 | 771,004 | 11,656,098 | 51,985,576 | 2,403,074 | 12,073,589 | 1,165,642 | 5,933,242 | 30,076,635 | 135,048,296 |
| 1913..... | 19,376,133 | 1,102,613 | 13,475,534 | 59,167,747 | 2,214,496 | 15,054,046 | 881,142 | 6,276,737 | 28,086,312 | 145,634,812 |
| 1914..... | 17,584,639 | 1,014,570 | 11,836,929 | 53,054,677 | 2,413,489 | 12,684,234 | 712,313 | 5,418,185 | 24,164,039 | 128,863,075 |

*Includes a small production of lime from Prince Edward Island.

MINE PRODUCTION.

Reference has already been made to the distinction between statistics of mine production and statistics based on smelter recoveries with particular reference to metalliferous ores.

For a number of years past this Division has endeavoured to obtain from every mine operator in Canada, an annual return with respect to labour employed, wages paid, tonnage and value of ores or minerals mined, treated and shipped, and in the case of metallic ores, the quantities of metals contained in the ores shipped or treated. In the case, however, of gold placer mining, and the production of crude petroleum, it has not as yet been found feasible to obtain complete returns from the operators themselves, so that in these cases, while a record of production is available, there is no record of the labour employed, nor the wages paid.

Statistics covering each of the past five years are shown in the accompanying tables. According to the records shown the total value of the mineral production compiled on this basis was \$114,239,635 in 1914, as against \$126,444,201 in 1913; \$120,332,966 in 1912; \$91,876,084 in 1911, and \$92,501,244 in 1910. Excluding placer and hydraulic workings and petroleum wells, the total number of shipping mines, clay works, quarries, etc., in 1914 was 1,661, as against 1,529 in 1913, and 1,437 in 1912. The total number of men employed was 56,855 in 1914, as against 71,011 in 1913 and 66,734 in 1912. The total wages paid were \$43,609,696 in 1914, as against \$50,368,602 in 1913 and \$45,502,479 in 1912.

The total number of metalliferous mines shipping in 1914, exclusive of placer and hydraulic workings, was 187 in 1914, as against 183 in 1913, and 163 in 1912; number of men employed in 1914, 11,994, as against 12,437 in 1913, and 10,612 in 1912; wages paid \$11,669,854 in 1914, compared with \$11,746,400 in 1913, and \$10,113,578 in 1912; tons of ore mined 4,997,406 in 1914, as against 4,736,288 in 1913, and 4,194,517 in 1912; tons of ore concentrates or metal shipped from mines 3,115,855 in 1914, as against 3,423,414 in 1913 and 3,360,451 in 1912; total net value of shipments including placer gold, \$44,763,179 in 1914, compared with \$47,170,740 in 1913 and \$46,457,423 in 1912.

In non-metalliferous mining, exclusive of stone quarries, clay works, etc., and not including petroleum wells, there were employed in 1914 an average of 33,732 men, earning in wages, \$22,058,526, as against 34,207 men employed and \$25,752,148 wages paid in 1913.

The manufacture of cement, clay products, and lime, and the quarrying of stone, etc., employed in 1914 an average of 21,129 men to whom were paid in wages, \$9,881,316. These operations in 1913 engaged an average of 24,367 men earning \$12,870,054.

It should be remembered that these records cover only active shipping mines and do not include the labour employed in prospecting or in develop-

ing new properties, nor is there included any record of the labour employed in the smelting and refining of ores, nor in blast furnace operations. The values of the ores given herein are in general those furnished by the operators. In certain cases, however, where such values have not been furnished, estimates have been made.

There has been added to the statement of ore shipments in 1914 and 1913, tables showing the quantities of metals contained in the ores shipped, the record showing the total quantities of metals contained without any deductions or allowances being made for smelter or treatment losses. Comparison of this record of metal contents of ore shipments with statistics of the production of the metals is not in all cases feasible because of the long lapse of time between the shipment from the mine and the treatment at the smelter.

Mine Production, 1910.

| | No. of mines or works. | Men employed. | | Wages paid. | Ores or minerals mined. | Metals, ores, concentrates or minerals shipped. | Net value of shipments. |
|--------------------------------|------------------------|---------------|----------|-------------|-------------------------|---|-------------------------|
| | | Under-ground. | Surface. | | | | |
| METALLIFEROUS ORES. | No. | No. | | \$ | Tons. | Tons. | \$ |
| Iron ores..... | 8 | 971 | | 443,998 | 335,768 | 259,418 | 574,362 |
| Milling gold ores— | | | | | | | |
| Bullion shipped..... | | | | | | | 659,987 |
| Concentrates..... | 47 | 969 | | 725,989 | 138,021 | 8,997 | 565,340 |
| Silver-cobalt ores— | | | | | | | |
| Mine bullion shipped..... | | | | | | 35 | 542,034 |
| Ore and concentrate..... | 38 | 1,623 | 1,322 | 2,642,133 | 274,780 | 35,627 | 15,344,470 |
| Nickel-copper ores..... | 7 | 660 | 286 | 719,237 | 652,392 | 652,392 | 2,609,568 |
| Copper ores..... | 3 | 118 | 97 | 105,366 | 54,220 | 36,714 | 172,162 |
| Silver-lead and zinc ores..... | 48 | 592 | 282 | 850,416 | 180,070 | 58,418 | 1,668,415 |
| Copper-gold-silver ores..... | 19 | 1,432 | 487 | 1,872,242 | 1,958,591 | 1,924,405 | 7,888,306 |
| Shipping mines not reporting— | | | | | | | |
| Silver-lead..... | 12 | 9 | | | | | |
| Copper-gold..... | 9 | | | | 1,994 | 1,994 | |
| Placer mining— | | | | | | | |
| Yukon..... | | | | | | | 4,550,000 |
| British Columbia..... | | | | | | | 540,000 |
| Other provinces..... | | | | | | | 1,850 |
| Total metallic..... | 191 | 8,839 | | 7,359,381 | 3,595,836 | 2,978,000 | 35,116,494 |
| Total non-metallic..... | | 36,210 | | 22,698,000 | 16,148,993 | 13,800,989 | 37,757,158 |
| Total structural material..... | | 17,259 | | 7,547,000 | | | 19,627,592 |
| Total..... | | 62,308 | | 37,604,381 | | | 92,501,244 |

Mine Production, 1911.

| | No. of mines or works. | Men employed. | | Wages paid. | Ores or minerals mined. | Metals, ores, concentrates or minerals shipped. | Net value of shipments. |
|---------------------------------|------------------------|---------------|----------|-------------|-------------------------|---|-------------------------|
| | | Under-ground. | Surface. | | | | |
| METALLIFEROUS ORES. | No. | No. | | \$ | Tons. | Tons. | \$ |
| Iron ores..... | 8 | 943 | | 449,468 | 421,113 | 210,344 | 522,319 |
| Milling gold ores— | | | | | | | |
| Bullion shipped..... | | | | | | | 513,991 |
| Concentrates..... | 45 | 1,085 | | 954,659 | 118,758 | 8,026 | 663,213 |
| Silver-cobalt ores— | | | | | | | |
| Mine bullion shipped..... | | | | | | 130 | 2,007,440 |
| Ore and concentrate..... | 36 | 1,794 | 1,448 | 2,722,228 | 254,290 | 25,539 | 14,400,245 |
| Nickel-copper ores..... | 7 | 858 | 425 | 889,894 | 612,511 | 612,511 | 2,450,044 |
| Copper ores..... | 2 | 119 | 67 | 98,084 | 66,088 | 39,047 | 247,555 |
| Silver-lead and zinc ores..... | 40 | 528 | 297 | 809,862 | 120,323 | 48,660 | 1,186,996 |
| Gold-copper-silver ores..... | 22 | 1,495 | 563 | 1,933,385 | 1,602,247 | 1,486,931 | 7,727,696 |
| Placer mining— | | | | | | | |
| Yukon..... | | | | | | | 4,606,812 |
| British Columbia..... | | | | | | | 426,000 |
| Other provinces..... | | | | | | | 8,202 |
| Total metallic..... | 160 | 9,622 | | 7,857,580 | 3,195,330 | 2,431,188 | 34,760,513 |
| Total non-metallic..... | | 32,126 | | 18,469,420 | 13,890,468 | 12,247,348 | 34,405,960 |
| Total structural materials..... | | 19,004 | | 8,827,508 | | | 22,709,611 |
| | | 60,752 | | 35,154,508 | | | 91,876,084 |

Mine Production, 1912.

| | No. of mines or works. | Men employed. | | Wages paid. | Ores or minerals mined. | Metals, ores, concentrates or minerals shipped. | Net value of shipments. |
|---------------------------------|------------------------|---------------|----------|-------------|-------------------------|---|-------------------------|
| | | Under-ground. | Surface. | | | | |
| METALLIFEROUS ORES. | No. | No. | | \$ | Tons. | Tons. | \$ |
| Iron ores..... | 8 | 524 | | 371,938 | 171,792 | 215,883 | 523,315 |
| Milling gold ore— | | | | | | | |
| Bullion shipped..... | 43 | | | | | 5 | 2,278,066 |
| Concentrates..... | | 1,671 | | 1,551,006 | 290,297 | 6,114 | 669,727 |
| Silver-cobalt ores— | | | | | | | |
| Mine bullion shipped..... | 31 | | | | | 164 | 2,899,360 |
| Ore and concentrate..... | | 1,685 | 1,448 | 3,107,286 | 319,348 | 29,106 | 14,592,559 |
| Nickel-copper ores..... | 3 | 970 | 830 | 1,404,652 | 737,726 | 737,726 | 2,953,306 |
| Copper ores..... | 3 | 154 | 95 | 160,765 | 64,952 | 60,869 | 508,993 |
| Silver-lead and zinc ores..... | 50 | 597 | 331 | 1,002,203 | 202,343 | 66,377 | 2,767,741 |
| Gold-copper-silver ores..... | 20 | 1,434 | 873 | 2,515,728 | 2,408,059 | 2,244,193 | 13,113,144 |
| Tungsten concentrates..... | | | | | | 14 | 7,840 |
| Placer mining— | | | | | | | |
| Yukon..... | | | | | | | 5,576,493 |
| British Columbia..... | | | | | | | 555,500 |
| Other provinces..... | | | | | | | 11,379 |
| Total metalliferous..... | 163 | 10,612 | | 10,113,578 | 4,194,517 | 3,360,451 | 46,457,423 |
| Total non-metalliferous..... | 443 | 33,954 | | 23,877,781 | 17,165,628 | 15,548,981 | 45,080,674 |
| Total structural materials..... | 831 | 22,168 | | 11,511,120 | | | 28,794,869 |
| | 1,437 | 66,734 | | 45,502,479 | | | 120,332,966 |

Mine Production, 1913.

| | No. of mines or works. | Men employed. | | Wages paid. | Ores or minerals mined. | Metals, ores, concentrates or minerals shipped. | Net value of shipments. |
|-----------------------------|------------------------|---------------|----------|-------------|-------------------------|---|-------------------------|
| | | Under-ground. | Surface. | | | | |
| METALLIFEROUS ORES. | No. | No. | | \$ | Tons. | Tons. | \$ |
| Iron ores..... | 12 | 877 | | 529,934 | 324,935 | 307,634 | 629,843 |
| Milling gold ore— | | | | | | | |
| Bullion shipped..... | | | | | | 11 | 5,060,018 |
| Concentrates..... | 50 | 2,210 | | 2,079,005 | 515,855 | 10,269 | 873,901 |
| Silver-cobalt ores— | | | | | | | |
| Mine bullion shipped..... | | | | | | 260 | 4,539,906 |
| Ore and concentrate..... | 30 | 2,089 | 1,525 | 3,387,069 | 456,241 | 40,579 | 12,565,718 |
| Nickel-copper ores..... | 9 | 1,258 | 617 | 1,665,659 | 784,697 | 784,697 | 3,138,788 |
| Copper ores..... | 3 | 191 | 92 | 155,318 | 97,899 | 87,376 | 458,136 |
| Silver-lead and zinc ores.. | 57 | 830 | 468 | 1,287,761 | 256,302 | 85,978 | 3,276,812 |
| Zinc products..... | | | | | | 7,889 | 186,827 |
| Gold-copper-silver ores... | 22 | 1,413 | 867 | 2,641,654 | 2,300,359 | 2,098,775 | 10,056,739 |
| Placer mining— | | | | | | | |
| Yukon..... | | | | | | | 5,874,052 |
| British Columbia..... | | | | | | | 510,000 |
| Other provinces..... | | | | | | | |
| Total metalliferous..... | 183 | 12,437 | | 11,746,400 | 4,736,288 | 3,423,468 | 47,170,740 |
| Total non-metalliferous.... | 435 | 34,207 | | 25,752,148 | 18,636,039 | 16,198,066 | 48,463,709 |
| Total structural materials | 911 | 24,367 | | 12,870,054 | | | 30,809,752 |
| | 1,529 | 71,011 | | 50,368,602 | | | 126,444,201 |

Mine Production 1913, Content of Shipments.

| | Gold. | Silver. | Nickel. | Copper. | Lead. | Zinc. |
|------------------------------|---------|------------|------------|------------|------------|-----------|
| | Ozs. | Ozs. | Lbs. | Lbs. | Lbs. | Lbs. |
| Milling gold ore— | | | | | | |
| Bullion..... | 250,851 | 59,015 | | | | |
| Concentrates..... | 46,959 | 33,898 | | 2,354 | 142,497 | |
| Silver-cobalt ores— | | | | | | |
| Mine bullion shipped..... | | 7,599,929 | | | | |
| Ore and concentrate..... | | 21,862,174 | | | | |
| Nickel-copper ores..... | | | 51,203,607 | 27,010,719 | | |
| Copper ores..... | 738 | 36,393 | | 4,996,393 | | |
| Silver-lead zinc ores..... | 999 | 2,564,155 | | | 53,807,570 | |
| Zinc products..... | | 143,459 | | | | 7,069,800 |
| Gold-copper-silver ores..... | 207,486 | 733,758 | | 60,090,180 | | |
| Placer mining— | | | | | | |
| Yukon..... | 282,320 | 63,522 | | | | |
| British Columbia..... | 24,671 | | | | | |
| Total..... | 814,024 | 33,096,303 | 51,203,607 | 92,099,646 | 53,950,067 | 7,069,800 |

Mine Production, 1914.

| | No. of mines or works. | Men employed. | | Wages paid. | Ores or minerals mined. | Metals, ores, concentrates or minerals shipped. | Net value of shipments. |
|-----------------------------|------------------------|---------------|----------|-------------|-------------------------|---|-------------------------|
| | | Under-ground. | Surface. | | | | |
| METALLIFEROUS ORES. | No. | No. | | \$ | Tons. | Tons. | \$ |
| Iron ores..... | 5 | 598 | | 364,489 | 345,410 | 244,854 | 542,041 |
| Milling gold ore— | | | | | | | |
| Bullion shipped..... | | | | | | 13 | 6,101,463 |
| Concentrates..... | 44 | 1,070 | 1,206 | 2,603,414 | 754,732 | 6,974 | 860,379 |
| Silver-cobalt ores— | | | | | | | |
| Mine bullion shipped..... | | | | | | 354 | 5,665,006 |
| Ore and concentrate... | 29 | 1,412 | 1,883 | 3,207,116 | 733,174 | 16,917 | 7,827,140 |
| Nickel-copper ores..... | 9 | 736 | 1,286 | 1,693,997 | 1,000,364 | 999,908 | 5,020,003 |
| Copper ores..... | 4 | 113 | 180 | 177,721 | 119,292 | 117,762 | 502,637 |
| Silver-lead and zinc ores.. | 76 | 394 | 817 | 1,110,876 | 186,646 | 70,207 | 2,652,802 |
| Zinc products..... | | | | | | 10,893 | 262,563 |
| Gold-copper-silver ores.. | 20 | 823 | 1,746 | 2,512,241 | 1,857,788 | 1,647,973 | 9,580,537 |
| Placer mining— | | | | | | | |
| Yukon..... | | | | | | 10 | 5,182,616 |
| British Columbia..... | | | | | | 1 | 565,000 |
| Other provinces..... | | | | | | (a) | 992 |
| Total metalliferous..... | 187 | 11,994 | | 11,669,854 | 4,997,406 | 3,115,855 | 44,763,179 |
| Total non-metalliferous.... | 451 | 33,732 | | 22,058,526 | 17,078,300 | 14,708,307 | 43,467,229 |
| Total structural materials | 1,023 | 21,129 | | 9,881,316 | | | 26,009,227 |
| | 1,661 | 66,855 | | 43,609,696 | 22,075,706 | 17,824,162 | 114,239,635 |

(a) Alberta's production.

Mine Production 1914, Content of Shipments.

| | Gold. | Silver. | Nickel. | Copper. | Lead. | Zinc. |
|------------------------------|---------|------------|------------|------------|------------|-----------|
| | Ozs. | Ozs. | Lbs. | Lbs. | Lbs. | Lbs. |
| Milling gold ore— | | | | | | |
| Bullion..... | 289,860 | 85,110 | | | | |
| Concentrates..... | 38,717 | 64,218 | | 90 | 15,141 | |
| Silver-cobalt ores— | | | | | | |
| Mine bullion shipped..... | | 10,335,527 | | | | |
| Ore and concentrate..... | | 15,523,608 | | | | |
| Nickel-copper ores..... | | | 60,800,799 | 36,300,532 | | |
| Copper ores..... | 1,059 | 51,440 | | 6,450,899 | | |
| Silver-lead zinc ores..... | 334 | 2,501,820 | | | 50,527,130 | |
| Zinc products..... | | 376,420 | | | | 9,101,460 |
| Gold-copper-silver ores..... | 182,784 | 761,890 | | 53,771,126 | | |
| Placer mining— | | | | | | |
| Yukon..... | 247,753 | 55,744 | | | | |
| British Columbia..... | 27,332 | | | | | |
| Alberta..... | 48 | | | | | |
| Total..... | 787,887 | 29,755,777 | 60,800,799 | 96,522,647 | 50,542,271 | 9,101,460 |

Labour and Wages Statistics Covering Non-Metalliferous Mines During 1912, 1913 and 1914.

| | 1912. | | | 1913. | | | 1914. | | |
|--|----------------------------|---------------|----------------|----------------------------|---------------|----------------|----------------------------|---------------|----------------|
| | No. active mines or works. | No. employed. | Wages paid. \$ | No. active mines or works. | No. employed. | Wages paid. \$ | No. active mines or works. | No. employed. | Wages paid. \$ |
| NON-METALLIC. | | | | | | | | | |
| Asbestos and asbestic..... | 10 | 2,955 | 1,401,653 | 10 | 2,951 | 1,687,957 | 10 | 2,992 | 1,283,977 |
| Coal..... | 244 | 27,581 | 20,784,843 | 236 | 27,917 | 22,065,141 | 231 | 27,571 | 19,060,011 |
| Feldspar..... | 4 | 80 | 31,487 | 5 | 78 | 33,900 | 5 | 104 | 29,197 |
| Graphite..... | 6 | 221 | 86,831 | 6 | 135 | 63,714 | 4 | 135 | 47,776 |
| Grindstones, pulpstones, scythestones..... | 6 | 149 | 35,057 | 5 | 125 | 27,500 | 5 | 155 | 34,950 |
| Gypsum..... | 19 | 1,381 | 579,952 | 18 | 1,400 | 641,735 | 16 | 1,149 | 552,192 |
| Mica and phosphate..... | 26 | 241 | 95,415 | 27 | 209 | 85,334 | 30 | 232 | 78,646 |
| Mineral pigments; barytes, and ochres..... | 4 | 65 | 21,270 | 4 | 64 | 25,818 | 4 | 73 | 21,146 |
| Mineral water..... | 14 | 90 | 34,550 | 14 | 79 | 36,639 | 18 | 64 | 32,058 |
| Natural gas..... | 76 | 433 | 302,012 | 78 | 547 | 614,425 | 92 | 561 | 474,293 |
| Peat..... | 3 | 27 | 4,450 | 2 | 37 | 5,000 | ..... | ..... | ..... |
| Pyrites..... | 4 | 115 | 110,888 | 6 | 151 | 131,161 | ..... | 214 | 165,001 |
| Quartz..... | 7 | 128 | 80,340 | 6 | 130 | 69,441 | 8 | 81 | 33,872 |
| Salt..... | 12 | 231 | 155,648 | 12 | 251 | 178,386 | 11 | 253 | 178,277 |
| Other†..... | 7 | 257 | 153,385 | 6 | 133 | 85,997 | 9 | 148 | 67,130 |
| Total non-metallic..... | 443 | 33,954 | 23,877,781 | 435 | 34,207 | 25,752,148 | 451 | 33,732 | 22,058,526 |
| STRUCTURAL. | | | | | | | | | |
| Cement..... | 26 | 3,461 | 2,623,902 | 27 | 4,276 | 3,466,451 | 24 | 2,977 | 2,271,006 |
| Clay products..... | 460 | 10,450 | 4,504,213 | 456 | 11,218 | 4,696,801 | 419 | 8,339 | 3,201,380 |
| Lime..... | 78 | 1,103 | 576,217 | 77 | 1,076 | 577,841 | 85 | 1,015 | 518,331 |
| Sand-line brick..... | 20 | 544 | 349,192 | 22 | 589 | 289,398 | 21 | 467 | 190,031 |
| Sand and gravel..... | 54 | 875 | 527,425 | 110 | 1,042 | 607,554 | 254 | 2,382 | 821,601 |
| Slate..... | 1 | 25 | 12,055 | 1 | 35 | 12,544 | 1 | 20 | 7,150 |
| Stone..... | 192 | 5,710 | 2,918,116 | 218 | 6,131 | 3,219,465 | 219 | 5,929 | 2,871,817 |
| Total structural..... | 831 | 22,168 | 11,511,120 | 911 | 24,367 | 12,870,054 | 1,023 | 21,129 | 9,881,316 |
| Total non-metalliferous..... | 1,274 | 56,122 | 35,388,901 | 1,346 | 58,574 | 38,622,202 | 1,474 | 54,861 | 31,939,842 |

† Includes: in 1912—actinolite, chromite, corundum, fluorspar, magnesite, manganese, talc, and tripolite. Includes: in 1913—actinolite, corundum, tripolite, and talc. Includes: in 1914—actinolite, chromite, corundum, magnesite, manganese, peat, talc and tripolite. Partial record only in 1912 and 1913.

SMELTER PRODUCTION.

Statistics of the production of copper, lead, and silver smelters and refineries, showing the tonnage of ore treated, the matte, blister, base bullion, or refined metal produced, etc., have been collected by this Branch since 1908.

The active smelting companies in 1914 were as follows:—

The Mond Nickel Company, Coniston, Ont.

The Canadian Copper Company, Copper Cliff, Ont.

The Coniagas Reduction Company, Thorold, Ont.

The Deloro Mining and Reduction Co., Deloro, Ont.

The Buffalo and Ontario Smelting Co., Kingston, Ont.

The Dominion Refineries, Ltd., North Bay, Ont.

The Metals Chemical Co., Ltd., Welland, Ont.

The North American Smelting Co., Kingston, Ont.

The Consolidated Mining and Smelting Co. of Canada, Ltd., Trail, B.C.

The Granby Consolidated Mining, Smelting and Power Co., Ltd., Grand Forks, and Anyox, B.C.

The British Columbia Copper Co., Ltd., Greenwood, B.C.

The total quantity of ores and concentrates treated in these smelters during 1914 was 2,649,935 tons (including 58,894 tons of imported ore), as compared with 3,037,391 tons in 1913. The largest proportion of the total tonnage, about 61 per cent in 1914, consists of the copper-gold-silver ores of British Columbia, chiefly from the Boundary (Phoenix and Greenwood) Rossland and Coast (Britannia, Texada Island and Granby Bay) districts. The nickel-copper ore of the Sudbury district, Ontario, contributed about 35.7 per cent of the tonnage, the balance being lead ores and other ores treated in lead furnaces and the silver cobalt ores of Ontario treated in silver smelters. Gold and silver ores treated by cyanide processes are not included in this record.

The quantities of the several classes of ores smelted during the past seven years, have been as follows:—

| Year. | Nickel-copper ores. | Silver-cobalt ores. | Lead ores. | Copper-gold-silver ores. | Totals. |
|-----------|---------------------|---------------------|------------|--------------------------|-----------|
| 1908..... | 360,180 | 7,182 | 53,545 | 1,797,488 | 2,218,395 |
| 1909..... | 462,336 | 8,384 | 54,539 | 1,850,889 | 2,376,148 |
| 1910..... | 628,947 | 9,466 | 57,549 | 1,987,752 | 2,683,714 |
| 1911..... | 610,834 | 9,330 | 55,408 | 1,517,981 | 2,193,553 |
| 1912..... | 725,065 | 8,097 | 59,932 | 2,212,316 | 3,005,410 |
| 1913..... | 823,403 | 6,124 | 78,010 | 2,119,754 | 3,027,291 |
| 1914..... | 947,053 | 5,681 | 71,224 | 1,626,197 | 2,650,155 |

The products obtained in Canada from the treatment of these ores include: pig lead produced at Kingston, Ont., (furnace idle in 1914); refined pig lead and lead pipe produced at Trail, B.C., and fine gold, fine silver,

copper sulphate and antimony, produced from the residue of the Trail lead refinery; silver bullion, white arsenic, nickel oxide and cobalt oxide produced in Ontario from the Cobalt district ores. In addition to these refined products, blister copper, copper matte, nickel-copper matte, cobalt material or mixed nickel and cobalt oxides are produced and exported for refining.

The aggregate results of smelting and refining operations may be summarized as shown in the next table. Unfortunately, the figures cannot be taken to represent the total production from smelting ores mined in Canada, since considerable quantities of copper and silver ores are still shipped to other smelters outside of Canada for smelting.

It should also be explained that the figures include the results of the treatment in British Columbia of a small quantity of imported ores.

Smelter and Refinery Production in Canada.

| Refined products produced. | Calendar Years. | | | | | |
|---|-----------------|------------|------------|------------|------------|------------|
| | 1909. | 1910. | 1911. | 1912. | 1913. | 1914. |
| Antimony.....Lbs. | 61,207 | | | | | |
| Gold.....Ozs. | 18,241 | 13,298 | 15,270 | 12,118 | 11,977 | 11,088 |
| Silver....." " | 14,242,545 | 16,373,799 | 19,078,768 | 17,572,217 | 13,789,709 | 11,096,861 |
| Lead.....Lbs. | 41,883,614 | 32,987,508 | 23,525,050 | 35,893,190 | 37,923,043 | 36,443,706 |
| Copper sulphate.. " " | 51,405 | 163,228 | 197,187 | 87,110 | 130,533 | 152,060 |
| Cobalt oxide..... " " | | | 154,174 | 349,054 | 660,079 | 899,027 |
| Nickel oxide..... " " | | | | | 268,304 | 392,512 |
| White arsenic..... " " | 2,258,087 | 3,003,467 | 4,194,209 | 4,090,768* | 3,384,249 | 3,474,322 |
| Matte, blister copper, and other smelter products obtained and exported for refining. | | | | | | |
| | Tons. | Tons. | Tons. | Tons. | Tons. | Tons. |
| (1) Blister copper..... | 14,239 | 13,918 | 10,710 | 17,063 | 15,270 | 13,238 |
| (2) Copper matte..... | 11,597 | 11,519 | 11,320 | 6,727 | 5,159 | 6,291 |
| (3) Nickel-copper matte.. | 25,845 | 33,033 | 32,607 | 41,925 | 47,150 | 46,396 |
| (4) Lead bullion..... | 2,010 | | | | | |
| (5) Cobalt material..... | | 54 | 630 | 642 | 122 | 101 |
| Metals contained in above unrefined smelter products. | | | | | | |
| Gold.....Ozs. | 200,129 | 197,181 | 175,189 | 184,815 | 213,279 | 170,818 |
| Silver....." " | 4,845,920 | 2,136,414 | 585,896 | 686,171 | 934,601 | 873,400 |
| Lead.....Lbs. | 3,973,810 | | | | | |
| Copper....." " | 53,328,583 | 56,149,299 | 29,855,868 | 58,405,910 | 59,245,722 | 59,237,016 |
| Nickel....." " | 27,041,957 | 37,587,676 | 34,098,744 | 44,841,542 | 49,676,772 | 45,517,937 |

(1) Blister copper carrying gold and silver values.

(2) Copper matte

(3) Bessemer nickel-copper carrying small gold and silver values as well as metals of the platinum group.

(4) Unrefined lead bullion carrying silver values.

(5) Cobalt material carrying nickel and silver values.

Nickel-Copper Ores.—These ores of the Sudbury district, together with a small tonnage from the Alexo mine in the district of Nipissing, Ontario, are treated in the smelters of the Canadian Copper Company at Copper Cliff, and the Mond Nickel Company at Coniston, formerly at Victoria Mines. In addition to the nickel and copper which will probably average slightly over 3 per cent nickel, and 2 per cent copper, these ores of the Sudbury district contain small amounts of gold, silver, platinum, and palladium. The present metallurgical practice involves the following processes:—

- I. Roasting the ores in open heaps, to remove part of the sulphur.
- II. Smelting in water-jacketed blast furnaces, to produce a low grade matte, containing 33 per cent copper-nickel and nearly all the precious metals.
- III. Converting the furnace matte in Bessemer basic converters, to make a matte containing about 80 per cent copper-nickel.
- IV. Refining the converter matte, separating the nickel-copper, and precious metals.

At the present time the first three processes only are carried on in Canada. The converter matte is shipped to the United States and to England for final treatment.

The total quantity of nickel-copper ore mined during 1914 was 1,000,364 tons and the quantity smelted 947,053 tons. There were produced 46,396 tons of Bessemer matte, containing 14,448 tons of copper and 22,759 tons of nickel. With the exception of 1913, this is the largest production since the beginning of operations in 1886. In 1913 there were smelted 823,403 tons of ore, from which was produced 47,150 tons of Bessemer matte, containing 12,938 tons of copper and 24,838 tons of nickel.

Statistics of smelter production from these ores since the commencement of this industry are shown in the following table:—

Smelter Production of the Nickel-Copper Ores of the Sudbury District.

| Calendar Year. | Ore mined. | Ore smelted. | Matte shipped. | Value matte. | Nickel content of matte. | Copper content of matte. |
|----------------|------------|--------------|----------------|--------------|--------------------------|--------------------------|
| | Tons. | Tons. | Tons. | \$ | Tons. | Tons. |
| 1886..... | 3,307 | 30,000 | | | 900 | 1,500 |
| 1887..... | 567 | | | | | |
| 1888..... | | 40,146 | 3,274 | | 432 | 733 |
| 1889..... | 44,990 | | | | | |
| 1890..... | | 72,558 | 10,336 | | 2,018 | 2,064 |
| 1891..... | 83,300 | | | | | |
| 1892..... | 74,381 | 96,038 | 11,681 | 766,422 | 1,207 | 1,102 |
| 1893..... | | | | | | |
| 1894..... | 103,223 | 68,618 | 10,188 | 890,834 | 1,991 | 1,821 |
| 1895..... | 74,135 | | | | | |
| 1896..... | 94,966 | 71,027 | 10,759 | 416,594 | 2,454 | 2,604 |
| 1897..... | 93,154 | | | | | |
| 1898..... | 123,820 | 96,370 | 13,968 | | 1,944 | 2,288 |
| 1899..... | 159,957 | | | | | |
| 1900..... | 196,420 | 121,924 | | 702,341 | 1,699 | 1,584 |
| 1901..... | 315,692 | | | | | |
| 1902..... | 269,538 | 121,924 | 23,336 | 1,076,306 | 2,759 | 4,187 |
| 1903..... | 136,033 | | | | | |
| 1904..... | 203,388 | 255,958 | | 1,661,839 | 2,872 | 2,834 |
| 1905..... | 277,766 | | | | | |
| 1906..... | 343,814 | 211,847 | 25,311 | 1,327,448 | 3,540 | 3,364 |
| 1907..... | 351,916 | | | | | |
| 1908..... | 409,551 | 207,030 | 13,832 | 2,686,469 | 4,594 | 4,318 |
| 1909..... | 451,892 | | | | | |
| 1910..... | 652,392 | 118,470 | 10,154 | 2,193,198 | 6,253 | 3,576 |
| 1911..... | 612,511 | | | | | |
| 1912..... | 737,726 | 251,421 | 17,405 | 4,019,814 | 5,274 | 2,455 |
| 1913..... | 784,697 | | | | | |
| 1914..... | 1,000,364 | 340,059 | 20,310 | 4,628,011 | 9,438 | 4,386 |
| | | | | | | |
| | | 359,076 | 22,025 | 3,289,382 | 10,745 | 5,264 |
| | | | | | | |
| | | 360,180 | 21,210 | 2,930,989 | 10,595 | 6,996 |
| | | | | | | |
| | | 462,336 | 25,845 | 1,913,012 | 9,572 | 7,503 |
| | | | | | | |
| | | 628,947 | 35,033 | 5,380,064 | 13,141 | 7,873 |
| | | | | | | |
| | | 610,834 | 32,607 | 4,945,593 | 18,636 | 9,630 |
| | | | | | | |
| | | 725,065 | 41,925 | 6,303,102 | 17,049 | 8,966 |
| | | | | | | |
| | | 823,403 | 47,150 | 7,076,945 | 22,421 | 11,116 |
| | | | | | | |
| | | 947,053 | 46,396 | 7,189,031 | 24,838 | 12,938 |
| | | | | | | |
| | | | | | 22,759 | 14,448 |

A large proportion of the ore tonnage shipped from the Cobalt district is still sent to smelters in the United States, although during the past three years there has been a considerable increase in the treatment of these ores by cyanidation and the recovery of silver at the mine in the form of bullion. Thus we find a further falling off, during 1914, in the recovery of silver at Ontario smelters and an increased amount of bullion produced at the mines.

The treatment of these ores in Ontario smelters during the past four years has given the following results:—

| | 1911. | 1912. | 1913. | 1914. |
|--|------------|------------|------------|-----------|
| Ore treated.....Tons. | 9,330 | 8,097 | 6,124 | 5,681 |
| Products recovered— | | | | |
| Silver produced†.....Ozs. | 17,753,167 | 15,675,218 | 11,356,707 | 9,042,993 |
| White arsenic.....Lbs. | 4,194,209 | 4,090,768 | 3,384,249 | 3,474,322 |
| Speiss or residues.....Tons | | | | |
| Cobalt oxide.....Lbs. } | 154,174 | 349,054 | | |
| Nickel oxide.....Lbs. } | | | 660,079 | 899,027 |
| Mixed cobalt and nickel oxides and cobalt material....." | 1,260,832 | 1,285,280 | 268,304 | 392,512 |

† Fine ounces contained in silver bullion, fineness ranging from 850 to 998.

Silver-Copper-Nickel-Arsenic Ores.—The first shipments of silver ores from the Cobalt district were made in 1904, and in 1906 the first works for the treatment of these ores in Canada were established by the Canadian Copper Company, at Copper Cliff, Ont. This plant was closed down, however, in 1913 because of the extended treatment of these ores in cyanide plants at the mines. Operations have been continuous at the plants of the Coniagas Reduction Company, at Thorold, and the Deloro Mining and Reduction Company, at Deloro, Ont. At each of these plants, nickel and cobalt oxide are recovered in addition to silver bullion and white arsenic. Several other plants have been operating more or less irregularly, those reporting production in 1914 being the Canada Refining and Smelting Company, Ltd., Orillia, The Buffalo and Ontario Smelting Company, Kingston, and The Standard Smelting and Refining Company, North Bay.

Lead Smelters.—The lead smelter and refinery at Trail, B.C., owned by the Consolidated Mining and Smelting Company, was the only lead smelter operated during 1914. The small plant at Kingston, Ontario, built by the North American Smelting Company, and completed in 1912 was operated in 1913 but remained idle throughout 1914.

In the lead refinery at Trail, the bullion from the smelter is cast into anodes and re-deposited electrolytically upon cathode sheets of refined lead. The refined lead is cast into pigs or manufactured into lead pipe. The slimes from the tank room carry gold, silver, antimony, arsenic, and copper.

The first two are recovered as fine metals, and the copper as copper sulphate. Antimony is also recovered, though not regularly and bearing metal is manufactured.

The annual production of refined lead, fine gold and silver, and copper sulphate has been as follows:—

| Calendar Year. | Refined lead. | Fine gold. | Fine silver. | Copper sulphate. |
|----------------|---------------|------------|--------------|------------------|
| | Lbs. | Ozs. | Ozs. | Lbs. |
| 1904..... | 7,519,440 | 4,336 | 551,450 | 56,000 |
| 1905..... | 15,804,509 | 8,602 | 1,088,328 | 77,175 |
| 1906..... | 20,471,314 | 9,993 | 1,263,809 | 143,135 |
| 1907..... | 26,607,461 | 10,395 | 1,631,422 | 97,751 |
| 1908..... | 36,549,274 | 15,346 | 1,956,039 | 203,379 |
| 1909..... | 41,883,614 | 18,241 | 2,003,003 | 51,405 |
| 1910..... | 32,987,508 | 13,298 | 1,798,960 | 163,228 |
| 1911..... | 23,525,050 | 15,270 | 1,325,601 | 197,187 |
| 1912..... | 37,008,490 | 12,118 | 1,896,999 | 87,110 |
| 1913..... | 39,663,766 | 11,977 | 2,433,002 | 130,533 |
| 1914..... | 36,443,706 | 11,088 | 2,043,868 | 152,060 |

Extensive improvements undertaken at the Trail smelter, during the year included the following additions and changes to the lead plant, as described by the General Manager in his Annual Report to the Directors:—

“Two Wedge roasters, having a capacity each of from 85 to 95 tons per day.

Conveyors and automatic scales for handling the ore from storage to the roasters, and for handling the pre-roasted product from roasters to sintering pots.

Three new lead blast furnaces and extensions to building, with crane for handling receivers and by-products, such as matte.

A Cottrell plant for clearing the blast furnace gases of lead fume.

Flues connecting the blast furnaces with the Cottrell plant.

New charge cars and some small equipment for the lead sampling mill.

"Your lead plant formerly handled a considerable tonnage of high-grade clean concentrates, comparatively low in sulphur and free from zinc, which was supplied mainly from the St. Eugene mine. With the working out of the St. Eugene mine, it has been necessary to replace the tonnage, to a large extent, with ore of lower grade and of a much more refractory nature, largely from the Sullivan mine; and carrying more sulphur and requiring more capacity for roasting and furnacing in order to produce an equal tonnage of lead.

"In the roasting plant, particularly, the seven Godfrey roasters with which the smelter was previously equipped had a capacity of only 25 tons per day each of Sullivan ore; the two Wedge roasters, just installed, have a capacity each of from 85 to 95 tons per day.

"The installation of conveyors handling the ore to and from the roasters will still further reduce the costs of operation of the roasters, by substituting mechanical equipment for manual labour.

"The costs of operating the Heberlein pot plant have already been materially reduced by the substitution of mechanical appliances for hand labor, which alterations were made last year.

"The building of new lead furnaces was made necessary by the condition of the old ones, which had been in operation for a long time, and it was considered advisable in rebuilding them to place them further from the copper plant, in order to allow for any necessary extensions to the copper plant; also to allow for better arrangements for charging and handling the products.

"The installation of the Cottrell plant was very necessary on account of large losses in fume from the blast furnaces. The flues and Cottrell plant are now saving in the neighborhood of eight tons per day of material high in lead, a considerable portion of which was previously lost."

Gold-Silver-Copper Ores of British Columbia.—Four copper smelters were active in British Columbia during 1914. These were the Trail copper furnace of the Consolidated Mining and Smelting Company treating the ores of the Rossland camp and other ores of the district; the Grand Forks plant of the Granby Consolidated Mining, Smelting and Power Co., and the Greenwood plant of the British Columbia Copper Company, treating chiefly the low grade ores of the Boundary district, and the Anyox plant of

the Granby Consolidated Company, treating the ores of the Hidden Creek mines at Anyox and other coast properties.

On the coast, the Tyee Copper Company's furnace at Ladysmith was idle throughout the year.

The aggregate production of British Columbia copper smelters during the past five years including the foreign ores treated, was as follows:—

Production British Columbia Copper Smelters.

| | 1911. | 1912. | 1913. | 1914. |
|--|------------|------------|------------|------------|
| Ore smelted.....Tons | 1,517,981 | 2,212,316 | 2,119,754 | 1,612,197 |
| Smelter products— | | | | |
| Matte....." | 11,320 | 6,727 | 5,159 | 6,291 |
| Blister....." | 10,710 | 17,069 | 15,270 | 13,238 |
| Metallic content of matte and blister— | | | | |
| Gold.....Ozs. | 175,189 | 184,815 | 213,279 | 170,818 |
| Silver....." | 585,896 | 686,171 | 934,601 | 873,400 |
| Copper.....Lbs. | 29,855,868 | 36,174,185 | 33,370,176 | 30,341,191 |

Trail Smelter.—Statistics of the production of the Trail smelter including both the copper and lead furnaces, have been published in the annual reports of the Company, the figures since 1896 having been as follows:—

Production of Trail Smelter.

| Fiscal Year. | Ore smelted. | METALS CONTAINED IN MATTE AND BULLION PRODUCED. | | | |
|--|--------------|---|------------|-------------|------------|
| | | Gold. | Silver. | Lead. | Copper. |
| | Tons. | Ozs. | Ozs. | Lbs. | Lbs. |
| 1906 (6 months), ending June 30th.... | 157,640 | 64,590 | 1,074,255 | 15,133,683 | 2,399,161 |
| 1907, ending June 30th..... | 222,573 | 69,168 | 1,100,271 | 20,283,083 | 3,443,310 |
| 1908 " "..... | 305,956 | 121,380 | 2,224,888 | 32,157,139 | 4,004,468 |
| 1909 " "..... | 347,417 | 114,920 | 2,443,475 | 43,675,077 | 4,637,631 |
| 1910 " "..... | 487,125 | 137,614 | 2,162,406 | 42,368,816 | 5,974,959 |
| 1911 " "..... | 388,785 | 119,067 | 1,458,758 | 24,026,015 | 4,421,988 |
| 1912 " "..... | 296,458 | 129,789 | 1,765,992 | 26,072,074 | 2,914,141 |
| 1913 (15 mos. to Sept. 30, 1913)..... | 407,124 | 186,017 | 3,224,408 | 48,325,252 | 3,454,814 |
| 1914 (12 mos. to Sept. 30, 1914)..... | 374,771 | 129,083 | 2,568,301 | 34,617,318 | 3,645,997 |
| Production from 1894 to Sept. 30, 1914 | 3,925,822 | 1,462,012 | 26,017,332 | 333,913,214 | 57,890,794 |

The General Manager's Report contains the following list of improvements and alterations to the copper plant of the smelter:—

“Rebuilding of three of the five blast furnaces and increasing the dimensions of two of them.

Building of a new smoke stack.

Repairs to the flues.

Installation of a crane in the copper furnace building, and re-building of the launders leading to the slag dump.

"Improvements to the copper plant were made necessary by the wearing out of jackets on the old furnaces. In rebuilding, two of them have been increased in size from 300 ins. to 420 ins. in length, and from 42 ins. to 50 ins. in width at the tuyeres. The enlarged furnaces so far show an increase in smelting capacity of from 60 per cent to 80 per cent over the older ones. This increase in capacity will result in a proportionate decrease in cost of labor and, probably, in a decrease in cost of coke per ton of ore smelted."

Granby and Anyox Smelters.—The Granby smelter is situated at Grand Forks in the Boundary district, and the Anyox smelter at Observatory Inlet, Portland canal; both are owned by the Granby Consolidated Mining, Smelting and Power Company. The ores treated at Grand Forks are those from the Company's mines at Phoenix together with a small tonnage of custom ore; while at the Anyox smelter the ores from the Hidden Creek mine and other coast properties are reduced.

The Phoenix ores have been of particular interest because of the low tenor of their metal values, their self-fluxing character, and the large tonnage treated. The percentage of metals contained has been decreasing and the recovery of metals during the year ending June 30, 1914, as shown in the Company's annual report was: copper 17.28 pounds; silver 0.332 ounces; and gold 0.0352 ounces per ton of ore smelted including recoveries from foreign ores.

The first furnace of 300 tons capacity was completed in 1900, and since that date the capacity of the plant has been increased from time to time until at present there are eight furnaces with a total capacity of about 4,500 tons per day. The converter plant was first installed in 1902, and enlarged in 1909.

At the Hidden Creek mines, Anyox, the ore in sight is estimated at 18,153,000 tons which it is believed will average 1.4 per cent copper. Of this amount it is estimated that 9,563,000 tons will average 2.2 per cent copper. The gold and silver values will average about 30 cents per ton or less than half the gold and silver values in the Phoenix ores.

At Anyox¹ "the furnaces, of which there are three, (with a total daily capacity of 2,000 tons) are 50 inches wide by 30 feet long, and are the regular type of rectangular water-jacketed matting furnace made by the Traylor Engineering & Mfg. Co. The furnaces are provided with 4½-inch tuyeres at 10-inch centers. The slag tap is at the side. The converter room is in one end of the main smelter building, in which are three converter stands. The converters of the Great Falls type are 12 feet in diameter.

"The downtakes from the furnaces, and the flue from the converter hoods, lead into a large dust chamber by the side of the main smelter building. From the center of the chamber the main flue leads up the hill to the reinforced-concrete stack 22 feet in diameter by 153 feet high, the top of which is about 300 feet above the furnaces."

¹ Engineering and Mining Journal, Jan. 3, 1914.

The quantities of ores smelted and the total production of metals shown in the accompanying table, are compiled from the Company's annual published reports.

The blast furnace department at Grand Forks was operated throughout the year ending June 30, 1914, and that at Anyox from March.

The furnaces treated:—

Phoenix ores.....1,201,955 dry tons

Anyox ores..... 63,105 " "

Foreign ores..... 23,940 " "

and produced 23,320,097 pounds of fine copper; 435,275 ounces of silver, and 43,882 ounces of gold.

Ores Smelted and Metals Recovered at Granby Smelters.

| Year ending June 30. | ALL MATERIALS SMELTED. | | | | METALS PRODUCED. | | |
|-------------------------|------------------------|----------|--------|------------|------------------|-----------|-------------|
| | Granby ore. | Foreign. | | Total. | Gold. | Silver. | Copper. |
| | | Ore. | Matte. | | | | |
| | Tons. | Tons. | Tons. | Tons. | Ozs. | Ozs. | Lbs. |
| 1901..... | 169,087 | 7,832 | ..... | 176,919 | 8,871 | 34,990 | 5,435,955 |
| 1902..... | 293,645 | 4,454 | 3,001 | 301,100 | 30,786 | 274,511 | 10,836,851 |
| 1903..... | 289,583 | 7,691 | 6,223 | 303,497 | 35,121 | 277,574 | 12,551,758 |
| 1904..... | 516,059 | 36,182 | 4,290 | 556,531 | 54,493 | 275,935 | 16,020,986 |
| 1905..... | 550,738 | 39,382 | ..... | 590,120 | 42,980 | 215,449 | 14,224,692 |
| 1906..... | 796,188 | 36,158 | ..... | 832,346 | 50,020 | 316,947 | 19,939,004 |
| 1907..... | 649,022 | 16,893 | ..... | 665,915 | 32,738 | 201,337 | 16,410,576 |
| 1908..... | 858,432 | 24,179 | ..... | 882,611 | 40,068 | 300,204 | 21,092,288 |
| 1909..... | 964,789 | 19,944 | ..... | 984,733 | 45,760 | 335,520 | 21,901,528 |
| 1910..... | 1,175,548 | 21,829 | ..... | 1,197,377 | 48,752 | 356,746 | 22,754,899 |
| 1911..... | 959,563 | 24,783 | ..... | 984,346 | 41,707 | 343,178 | 17,858,860 |
| 1912..... | 721,719 | 17,800 | ..... | 739,519 | 33,932 | 225,305 | 13,231,121 |
| 1913..... | 1,264,690 | 15,179 | ..... | 1,279,869 | 47,266 | 324,336 | 22,688,614 |
| 1914..... | 1,265,060 | 23,940 | ..... | 1,289,000 | 43,882 | 435,275 | 23,320,097 |
| Total..... | 10,474,123 | 296,246 | 13,514 | 10,783,883 | 556,376 | 3,917,307 | 238,267,229 |

Greenwood Smelter.—The plant of the British Columbia Copper Company, at Greenwood, B.C., includes three large furnaces, having a total daily capacity of from 2,400 to 2,500 tons, and a converter plant.

The last annual published report of the Company covering the year ending December 31, 1914, contains the following references to smelting operations:—

"The smelter was not operated to full capacity, due to shortage of custom ore. This in connection with the low price of copper, made it apparent, early in the year, that it was a question of very little time before operations must cease entirely. The furnaces were blown out on the 23rd of August and the plant cleaned up as far as practicable.

"The total amount of ore smelted from January 1st to August 23rd was 299,928 tons, and consisted of:—

| | |
|-----------------------------|---------------|
| B. C. Copper Co's ores..... | 193,512 tons. |
| Custom ores..... | 106,416 " |

"The amount of converter slag made and smelted was 5,129 tons, and contained 1,627 tons of custom ore and 466 tons of clay.

"The amount of coke used was 41,026 tons and represented 13·52% of the entire charge fed to the furnaces.

"The time of actual operation was 450 furnace days; the total amount of charge smelted, ex-coke was 303,430 tons, or amount of charge smelted per furnace day, 674 tons.

"The average grade of the matte was 39·7% copper.

"The blast furnace slag contained 0·251% copper; 0·0039 ozs. gold; and 0·07 ozs. silver per ton. The average analysis was; Silica, 41·9%; iron, 18·00%; lime, 22·0%. The recoveries, based on blister copper returns, slag losses and metals tied up in process, showed as follows: Gold, 101·39%; silver, 75·48%; copper, 77·27%. The production was:—

| | |
|--------------------|----------------|
| Copper (fine)..... | 4,116,190 lbs. |
| Gold " | 14,442·28 oz. |
| Silver " | 63,501·27 oz." |

METALLIC ORES.

ALUMINIUM.

No commercial ores of aluminium have as yet been found in Canada. Aluminium is, however, made in extensive works at Shawenegan Falls, Quebec, from bauxite ores imported from France, Germany, and the United States, by the Northern Aluminium Company. A wire mill for the manufacture of aluminium wire and cables is also operated by the same firm.

There being but one firm engaged in the manufacture of aluminium, we are precluded from publishing statistics of production.

Imports of alumina, probably including bauxite, and exports of aluminium are, however, published in the reports of the Department of Customs.

During the twelve months ending December 31, 1914, the imports of alumina were 28,557,000 pounds, or 14,279 tons valued at \$571,419. The imports of aluminium in ingots, bars, etc., were 3,812,128 pounds, or 1,906 tons, valued at \$752,753, besides manufactures of aluminium valued at \$107,598. During the same period exports of aluminium in ingots, bars, etc., amounted to 14,510,800 pounds valued at \$2,364,907 together with manufactures of aluminium valued at \$5,571.

The imports of alumina and exports of aluminium during the past ten years, and the imports of aluminium during the past five years, are shown in tabular form as follows:—

Annual Imports of 'Alumina' and Exports of Aluminium.

| Calendar Year. | Imports of alumina. | | EXPORTS OF ALUMINIUM. | | |
|----------------|---------------------|--------------|-----------------------|--------------|--------------|
| | | | Ingots, bars, etc. | | Manufactures |
| | Lbs. | Value. \$ | Lbs. | Value. \$ | Value. \$ |
| 1905..... | 5,360,800 | 138,765 | 2,535,386 | 508,219 | 1,588 |
| 1906..... | 8,975,400 | 239,136 | 4,521,486 | 899,113 | 2,244 |
| 1907..... | 12,705,300 | 268,502 | 5,478,203 | 1,109,353 | 1,499 |
| 1908..... | 11,485,500 | 29,752 | 1,713,800 | 399,785 | 1,727 |
| 1909..... | 11,794,100 | 234,544 | 6,134,500 | 918,195 | 3,453 |
| 1910..... | 19,464,400 | 403,283 | 7,722,400 | 1,160,242 | 3,741 |
| 1911..... | 19,607,200 | 372,009 | 4,990,100 | 747,587 | 1,555 |
| 1912..... | 22,400,500 | 448,061 | 18,285,700 | 2,002,363 | 10,898 |
| 1913..... | 30,704,200 | 614,713 | 13,015,000 | 1,762,214 | 8,203 |
| 1914..... | 28,557,000 | 571,419 | 14,510,800 | 2,364,907 | 5,571 |

The price of aluminium No. 1 ingots in New York did not fluctuate much during the whole year, the lowest average weekly quotation was 16½ cents in May, and the highest was 20½ cents in September; the average for the year being 18¾ cents.

In Europe, prices for aluminium for several years have been considerably lower than in the United States. In 1914 the prices, as reported by the London Mining Journal, ranged from £81 to £94 per long ton, or otherwise from 17½ to 20½ cents per pound.

The average yearly prices as reported by the "Metallgesellschaft" are shown in tabular form.

Annual Imports of Aluminium.

| Calendar Year. | Ingots, blooms, bars. | | Tubing. | | Manufactures. | Total. |
|----------------|-----------------------|---------|---------|--------|---------------|---------|
| | Lbs. | Value. | Lbs. | Value. | | |
| | | \$ | | \$ | \$ | \$ |
| 1910..... | 3,180,250 | 674,683 | 10,019 | 4,203 | 77,664 | 756,550 |
| 1911..... | 2,527,120 | 531,273 | 3,594 | 1,495 | 115,278 | 648,046 |
| 1912..... | 2,396,375 | 410,022 | 11,624 | 3,654 | 120,029 | 533,705 |
| 1913..... | 3,455,686 | 604,582 | 19,856 | 9,174 | 131,938 | 745,694 |
| 1914..... | 3,796,353 | 745,855 | 15,775 | 6,898 | 107,598 | 860,351 |

Average Monthly Price of Ingot Aluminium.¹

(At New York in cents per pound).

| | 1911. | 1912. | 1913. | 1914. |
|----------------|-------|-------|-------|-------|
| January..... | 20.13 | 19.13 | 26.31 | 18.81 |
| February..... | 21.25 | 19.44 | 26.04 | 18.81 |
| March..... | 21.15 | 19.58 | 27.05 | 18.50 |
| April..... | 20.75 | 20.38 | 27.03 | 18.16 |
| May..... | 20.55 | 21.69 | 26.44 | 17.95 |
| June..... | 20.03 | 22.83 | 24.68 | 17.75 |
| July..... | 20.20 | 23.50 | 23.38 | 17.66 |
| August..... | 20.02 | 24.38 | 22.70 | 19.88 |
| September..... | 19.34 | 25.13 | 21.69 | 19.94 |
| October..... | 18.75 | 26.25 | 20.13 | 18.50 |
| November..... | 18.79 | 26.56 | 19.35 | 18.00 |
| December..... | 18.85 | 25.75 | 18.88 | 18.96 |
| | 20.07 | 22.01 | 23.64 | 18.63 |

¹ As quoted by the Engineering and Mining Journal.

Yearly Average Prices of Aluminium at European Works.¹

| Year. | In marks per Kg. | In cents per pound. | Year. | In marks per Kg. | In cents per pound. |
|-----------|------------------|---------------------|-----------|------------------|---------------------|
| 1902..... | 2.25-2.50 | 24½-27 | 1908..... | 1.30-2.00 | 14-21½ |
| 1903..... | 2.25-2.50 | 24½-27 | 1909..... | 1.25-1.50 | 13½-16 |
| 1904..... | 2.25-2.50 | 24½-27 | 1910..... | 1.30-1.60 | 14-17½ |
| 1905..... | 3.25-3.75 | 35-40½ | 1911..... | 1.05-1.25 | 11-13½ |
| 1906..... | 3.25-3.75 | 35-40½ | 1912..... | 1.25-1.75 | 13½-18½ |
| 1907..... | 3.25-4.00 | 35-43½ | 1913..... | 1.60-1.80 | 17½-19½ |

¹ From Statistical report of the Metallgesellschaft.

The "Mineral Industry" reports the estimated production of aluminium in principal countries during 1914, as follows, in metric tons: United States 42,270; Canada 6,820 (exports); Germany, Austria-Hungary 4,000; Switzerland 10,000; France 12,000; England 8,000; Italy 800; and Norway 2,500; or a total of 86,390 metric tons.

ANTIMONY.

The production of antimony in Canada has been not only small, but spasmodic.

The last production reported was in 1909 and consisted of 364 tons of antimony concentrates, valued at \$13,906, shipped from West Gore, Nova Scotia.

The auriferous antimony property at West Gore, formerly operated by the Dominion Antimony Company, Limited, was taken over in July, 1909, by the West Gore Antimony Company.

The mines and works of the Canadian Antimony Company, Limited, at Lake George, New Brunswick, have not been in operation since 1909.

In British Columbia, some of the lead ores contain a small percentage of antimony—about one-third of one per cent. Some refined antimony was recovered at Trail in 1907 and 1909.

Annual Shipments of Antimony Ore.*

| Calendar Year. | Tons. | Value. | Calendar Year. | Tons. | Value. |
|-------------------|-------|--------|------------------------|-------|--------|
| | | \$ | | | \$ |
| 1886..... | 665 | 31,490 | 1905 (a)..... | 527 | |
| 1887..... | 584 | 10,860 | 1906 (a)..... | 782 | |
| 1888..... | 345 | 3,696 | 1907..... | 2,016 | 65,000 |
| 1889..... | 55 | 1,100 | *Refined antimony..... | | 5,108 |
| 1890..... | 26½ | 625 | 1908 (b)..... | 148 | 5,443 |
| 1891..... | 10 | 60 | 1909..... | 35 | 1,575 |
| 1892 to 1897..... | Nil. | Nil. | *Refined antimony..... | | 4,285 |
| 1898..... | 1,344 | 20,000 | 1910..... | 364 | 13,906 |
| 1899 to 1904..... | Nil. | Nil. | 1911..... | | |

(a) As recorded by the Nova Scotia Department of Mines; no value given.

(b) Exports.

* Refined antimony: 63,850 pounds in 1907 and 61,207 pounds in 1909.

Exports of Antimony Ore.

| Calendar Year. | Tons. | Value. | Calendar Year. | Tons. | Value. |
|----------------|-------|--------|----------------|-------|--------|
| | | \$ | | | \$ |
| 1880..... | 40 | 1,948 | 1899..... | 6½ | 190 |
| 1881..... | 34 | 3,308 | 1900..... | 210 | 3,441 |
| 1882..... | 323 | 11,673 | 1901..... | 10 | 1,643 |
| 1883..... | 165 | 4,200 | 1902..... | 90 | 13,658 |
| 1884..... | 483 | 17,875 | 1903..... | 33 | 4,332 |
| 1885..... | 758 | 36,250 | 1904..... | 160 | 7,237 |
| 1886..... | 665 | 31,490 | 1905..... | 525 | 27,118 |
| 1887..... | 229 | 9,720 | 1906..... | 420 | 17,064 |
| 1888..... | 352½ | 6,894 | 1907..... | 1,327 | 37,807 |
| 1889..... | 30 | 695 | 1908..... | 148 | 5,443 |
| 1890..... | 38 | 1,000 | 1909..... | 4 | 120 |
| 1891..... | 3½ | 60 | 1910..... | 239 | 14,095 |
| 1892-1897..... | Nil. | Nil. | 1911..... | 57 | 4,946 |
| 1898..... | 1,232 | 15,295 | 1912-1914..... | Nil. | Nil. |

Imports of Antimony.

| Fiscal Year. | Lbs. | Value. | Fiscal Year. | Lbs. | Value. | |
|--------------|---|--------|--------------------|------------|---------|--------|
| | | \$ | | | \$ | |
| 1880..... | 42,247 | 5,903 | 1898..... | 156,451 | 12,350 | |
| 1881..... | | 7,060 | 1899..... | 289,066 | 16,851 | |
| 1882..... | 183,597 | 15,044 | 1900..... | 186,997 | 20,001 | |
| 1883..... | 105,346 | 10,355 | 1901..... | 350,737 | 24,714 | |
| 1884..... | 445,600 | 15,564 | 1902..... | 504,822 | 39,276 | |
| 1885..... | 82,012 | 8,182 | 1903..... | 468,146 | 65,434 | |
| 1886..... | 89,787 | 6,951 | 1904..... | 418,943 | 27,112 | |
| 1887..... | 87,827 | 7,122 | 1905..... | 186,454 | 12,828 | |
| 1888..... | 120,125 | 12,242 | 1906..... | 403,918 | 56,297 | |
| 1889..... | 119,034 | 11,206 | 1907 (9 mos.)..... | 321,385 | 71,493 | |
| 1890..... | 117,066 | 17,439 | 1908..... | 484,899 | 66,484 | |
| 1891..... | 114,084 | 17,483 | 1909..... | 444,254 | 32,133 | |
| 1892..... | 180,308 | 17,680 | Calendar year..... | | | |
| 1893..... | 181,823 | 14,771 | 1910..... | 483,282 | 34,488 | |
| 1894..... | 139,571 | 12,249 | 1911..... | 579,466 | 38,823 | |
| 1895..... | 79,707 | 6,131 | 1912..... | 1,053,728 | 67,653 | |
| 1896..... | 163,209 | 9,557 | 1913..... | 690,699 | 51,829 | |
| 1897..... | 134,661 | 8,031 | 1914..... | 694,150 | 57,715 | |
| | | | | | | |
| | | | | | \$ | |
| 1914 | {Antimony, or regulus of, not ground, pulverized or otherwise manufactured..... | | | Duty free. | 648,516 | 47,498 |
| | {Antimony salts..... | | | " | 45,634 | 10,217 |
| Total..... | | | | | 694,150 | 57,715 |

The average prices of antimony, as quoted by the Engineering and Mining Journal, are shown in the following table:—

Average Prices of Antimony.

| | 1912. | | | 1913. | | | 1914. | | |
|----------------|------------|------|-------------|------------|-------------------|--------------------------|------------|--------|-------------|
| | Cookson's. | U.S. | Ordinaires. | Cookson's. | U.S. ¹ | Ordinaires. ² | Cookson's. | U.S. | Ordinaires. |
| January..... | 7-53 | 7-47 | 6-88 | 9-94 | 9-53 | 8-97 | 7-388 | 7-110 | 6-125 |
| February..... | 7-27 | 7-44 | 6-83 | 9-47 | 9-09 | 8-25 | 7-250 | 7-057 | 6-100 |
| March..... | 7-65 | 7-56 | 6-86 | 9-28 | 8-85 | 8-18 | 7-315 | 7-073 | 6-053 |
| April..... | 8-05 | 7-75 | 6-94 | 9-13 | 8-50 | 7-98 | 7-363 | 7-048 | 6-006 |
| May..... | 8-02 | 7-75 | 7-10 | 8-88 | 8-37 | 7-79 | 7-365 | 7-020 | 5-845 |
| June..... | 8-09 | 7-78 | 7-21 | 8-79 | 8-27 | 7-64 | 7-250 | 7-000 | 5-825 |
| July..... | 8-42 | 7-96 | 7-50 | 8-54 | 8-08 | 7-55 | 7-210 | 6-940 | 5-638 |
| August..... | 8-59 | 7-98 | 7-70 | 8-38 | 7-91 | 7-39 | 17-250 | 15-800 | 13-800 |
| September..... | 9-12 | 8-50 | 8-26 | 8-37 | 7-93 | 7-37 | 11-830 | ..... | 9-940 |
| October..... | 10-30 | 9-62 | 9-30 | 7-60 | 7-27 | 6-49 | 14-680 | ..... | 12-060 |
| November..... | 10-39 | 9-86 | 9-30 | 7-62 | 7-30 | 6-45 | 17-750 | ..... | 14-450 |
| December..... | 10-21 | 9-62 | 9-18 | 7-50 | 7-25 | 6-13 | 16-130 | ..... | 13-310 |
| | 8-90 | 8-26 | 7-76 | 8-73 | 8-22 | 7-52 | 10-732 | ..... | 8-763 |

¹ United States brands.

² Hungarian, Chinese, or other "Foreign" brands.

The weekly quotations showed that the price of antimony, ordinary brands, was 5½ cents at the beginning of August, rose to 18 cents in the middle of the same month, gradually declining again to 9 cents in October. During the last months of the year, however, the price again rose to 12 and 14 cents.

COBALT.

The silver-cobalt-nickel-arsenides of Coleman and adjacent townships, more familiarly known as the Cobalt district, in the Province of Ontario, are now the principal sources of the world's production of cobalt.

The recovery of this metal in Canada has been in the form of cobalt-oxide and mixed oxides of cobalt and nickel, produced by the smelters treating the above ores, together with cobalt residues produced at the high grade mill of the Nipissing Mining Company. While these residues have been chiefly exported, a portion has been shipped to the Canadian smelters producing cobalt-oxide.

According to direct returns there were produced during 1914, 899,027 pounds of cobalt-oxide, valued at \$571,710, and 392,512 pounds of nickel-oxide valued at \$34,883. The production of mixed oxides of cobalt and nickel, together with the shipments abroad of cobalt residues, amounted to 2,079,001 lbs., valued at \$79,995, and containing 242,572 pounds of metallic cobalt. Assuming the cobalt-oxide to average 70 per cent cobalt the total production of the metal would approximate 871,891 pounds in 1914.

No record is available as to the recovery of cobalt from silver ores exported but it is stated that cobalt speiss has been accumulated at United States smelters treating these ores.¹

The production of cobalt-oxide, nickel-oxide and cobalt material during the past three years has been as follows:—

Production of Cobalt and Nickel-Oxides.

| Year. | Cobalt oxide. | | Nickel oxide. | | Mixed oxides of cobalt and nickel and other cobalt material. | |
|-----------|---------------|-----------|---------------|----------|--|-----------|
| | Pounds. | Value. | Pounds. | Value. | Pounds. | Value. |
| 1912..... | 257,677 | \$128,843 | 91,377 | \$ 9,137 | 1,285,280 | \$163,988 |
| 1913..... | 660,079 | 525,028 | 268,304 | 30,122 | 3,216,000 | 90,266 |
| 1914..... | 899,027 | 571,710 | 392,512 | 34,883 | 2,079,001 | 79,995 |

The following table shows the ore shipments and estimated cobalt content, as published by the Ontario Bureau of Mines:—

Shipments of Silver and Cobalt Ores and Estimated Cobalt Content

| Year. | Ores shipped. | Estimated total cobalt content. | Per cent. | Year. | Ores shipped. | Estimated total cobalt content. | Per cent. |
|----------|---------------|---------------------------------|-----------|-----------|---------------|---------------------------------|-----------|
| | Tons. | Tons. | | | Tons. | Tons. | |
| 1904.... | 158 | 16 | 10.1 | 1910..... | 34,282 | 1,098 | 3.2 |
| 1905.... | 2,144 | 118 | 5.5 | 1911..... | 26,653 | 852 | 3.2 |
| 1906.... | 5,335 | 321 | 6.0 | 1912..... | 21,933 | 934 | 3.2 |
| 1907.... | 14,788 | 739 | 5.0 | 1913..... | 20,877 | 821 | 3.2 |
| 1908.... | 25,624 | 1,224 | 4.7 | 1914..... | ..... | ..... | ..... |
| 1909.... | 30,677 | 1,533 | 5.0 | | | | |

¹ Mineral Resources of the United States, 1913, p. 340.

The result of researches on cobalt and cobalt alloys, undertaken for the Mines Branch, by Dr. H. T. Kalmus, at Queens University, have been published in two reports.¹

Under the provisions of the "Metal Refining Bounty Act," passed by the Ontario Legislature in 1907, bounties amounting to \$26,038.02 were paid to the refineries on cobalt-oxide, and \$8,978.70 on nickel-oxide in 1913; and \$26,744.75 on cobalt-oxide and \$10,280.28 on nickel-oxide, in 1914.

The bounty is at the rate of six cents per pound on the metallic contents of the oxides. The "Act" which expires in April, 1917, is quoted with the amendment, as follows:—

An Act to Encourage the Refining of Metals in Ontario.

Whereas, it is desirable to encourage the refining of nickel, cobalt, copper and arsenic ores within the Province;

Therefore His Majesty, by and with the advice and consent of the Legislative Assembly of the Province of Ontario, enacts as follows:—

1. This Act may be cited as 'The Metal Refining Bounty Act.'
2. The treasurer of the Province may, under the authority of such regulations as may from time to time be made in that behalf by the Lieutenant-Governor in Council, pay in each year to the refiners of the metals or metal compounds hereinafter specified, when refined in the Province from ores raised and mined in the Province, a bounty upon each pound of such metal or compound so refined as follows:—

Class 1.—On refined metallic nickel or on refined oxide of nickel, 6 cents per pound on the free metallic nickel or on the nickel contained in the nickel-oxide; but nickel upon which a bounty has already been paid in one form of product shall not be entitled to any further bounty in any other form; and the amount to be paid as bounty on the nickel products herein mentioned is not to exceed in all \$60,000 in any one year.

Class 2.—On refined metallic cobalt or on refined oxide of cobalt 6 cents per pound on the free metallic cobalt or on the cobalt contained in the oxide of cobalt; but cobalt upon which a bounty has already been paid in one form of product shall not be entitled to any further bounty in any other form; and the amount to be paid as bounty on the cobalt products herein mentioned is not to exceed in all \$30,000 in any one year.

Class 3.—On refined metallic copper or on refined sulphate of copper, 1½ cents per pound on the free metallic copper or on the copper contained in the sulphate of copper; or on any copper product carrying at least 95 per cent of metallic copper, one-half cent per pound; but copper upon which a bounty has already been paid in one form of product shall not be entitled to any further bounty in any other form; and the amount to be paid as

¹ Mines Branch No. 259 "Preparation of Metallic Cobalt by Reduction of the Oxide." Report on, by H. T. Kalmus, B.Sc., Ph.D.

Mines Branch No. 309 "The Physical Properties of the Metal Cobalt." Report on, by H. T. Kalmus, B.Sc., Ph.D.

bounty on the copper products herein mentioned is not to exceed in all \$60,000 in any one year.

Class 4.—On white arsenic, otherwise known as arsenious acid, produced from mispickel ores and not from ores carrying smaltite or niccolite or cobaltite, one-half cent per pound; but the amount to be paid as bounty on the arsenic compound herein mentioned is not to exceed in all \$15,000 in any one year.

(1) Provided, however, that if so much of any of the above-mentioned classes of refined products is refined in the Province in any one year that the amount hereby set apart in respect of the said class would be insufficient to pay the bounties herein provided therefor, then the bounty payable to the refiners of such class of refined products shall abate and be payable upon a *pro rata* basis so that not more than the maximum amount herein specified for any of the said classes shall be paid in respect of said class in any one year.

(2) Provided, also, that the bounties herein provided for shall cease and determine with the payment of any sum or sums which shall have been earned during the period of five years from the passing of this Act.

(3) No person, firm or company shall be entitled to claim or receive any of the bounties in this Act provided for unless such person, firm or company shall have been at all times prepared and ready and willing during the period for which the bounty is claimed, to smelt, treat and refine ores from which the same product as that on which the bounty is claimed can be produced, belonging to any other person, firm or company, at rate and on terms and conditions approved by the Lieutenant-Governor in Council, or shall have been ready to purchase such ores at rates approved by the Lieutenant-Governor in Council at current market rates.

An Act to Amend the Act to Encourage the Refining of Metals in Ontario.

His Majesty, by and with the advice and consent of the Legislative Assembly of the Province of Ontario, enacts as follows:—

1. Subsection 2 of section 2 of The Metal Refining Bounty Act is amended by striking out the word 'five' where the same appears in the last line of the said subsection, and substituting therefor the word 'ten.'

COPPER.

The total production of copper in Canada in 1914 estimated on the basis of smelter recovery from ores treated, was 75,735,960 pounds, which, at the average price of copper for the year in New York 13.602 cents per pound, would be worth \$10,301,606.

Since 1912 there has been a gradual falling off in quantity, and owing to the decrease in the price of the metal, a still greater falling off in value.

Statistics showing the annual copper production of Canada since 1886 are given in the following table, which shows the yearly increase or decrease as the case may be and also the yearly price per pound in New York:—

Annual Production of Copper.

| Calendar Year. | Lbs. | INCREASE OR DECREASE. | | Value. | INCREASE OR DECREASE. | | Average price per pound. |
|----------------|------------|-----------------------|-------|------------|-----------------------|--------|--------------------------|
| | | Lbs. | % | | \$ | % | |
| | | | | \$ | | | Cts. |
| 1886..... | 3,505,000 | | | 385,550 | | | 11.00 |
| 1887..... | 3,260,424 | (d) 244,576 | 6.99 | 366,798 | (d) 18,752 | 4.86 | 11.25 |
| 1888..... | 5,562,864 | 2,302,440 | 70.60 | 927,107 | 560,309 | 152.70 | 16.66 |
| 1889..... | 6,809,752 | 1,246,888 | 22.40 | 936,341 | 9,234 | 0.99 | 13.75 |
| 1890..... | 6,013,671 | (d) 796,081 | 11.69 | 947,153 | 10,812 | 1.15 | 15.75 |
| 1891..... | 9,529,401 | 3,515,730 | 58.46 | 1,226,703 | 279,550 | 29.51 | 12.87 |
| 1892..... | 7,087,275 | 2,442,126 | 25.63 | 818,580 | (d) 408,123 | 33.27 | 11.55 |
| 1893..... | 8,109,856 | 1,022,381 | 14.40 | 871,809 | 53,229 | 6.50 | 10.75 |
| 1894..... | 7,708,789 | (d) 401,067 | 4.94 | 736,960 | (d) 134,849 | 15.46 | 9.56 |
| 1895..... | 7,771,639 | 62,850 | 0.81 | 836,228 | 99,268 | 13.47 | 10.76 |
| 1896..... | 9,393,012 | 1,621,373 | 20.86 | 1,021,960 | 185,732 | 22.21 | 10.88 |
| 1897..... | 13,300,802 | 3,907,790 | 41.60 | 1,501,660 | 479,700 | 46.94 | 11.29 |
| 1898..... | 17,747,136 | 4,446,334 | 33.43 | 2,134,980 | 633,320 | 42.17 | 12.03 |
| 1899..... | 15,078,475 | (d) 2,668,661 | 15.04 | 2,655,319 | 520,339 | 24.37 | 17.61 |
| 1900..... | 18,937,138 | 3,858,663 | 25.59 | 3,065,922 | 410,603 | 15.46 | 16.19 |
| 1901..... | 37,827,019 | 18,889,881 | 99.75 | 6,096,581 | 3,030,659 | 98.84 | 16.117 |
| 1902..... | 38,804,259 | 977,240 | 2.58 | 4,511,383 | (d) 1,585,198 | 26.00 | 11.626 |
| 1903..... | 42,684,454 | 3,880,195 | 10.00 | 5,649,487 | 1,138,104 | 25.23 | 13.235 |
| 1904..... | 41,383,722 | (d) 1,300,732 | 3.05 | 5,306,635 | (d) 342,852 | 6.07 | 12.823 |
| 1905..... | 48,092,753 | 6,709,031 | 16.21 | 7,497,660 | 2,191,025 | 41.29 | 15.590 |
| 1906..... | 55,609,888 | 7,517,135 | 15.63 | 10,720,474 | 3,222,814 | 42.98 | 19.278 |
| 1907..... | 56,979,205 | 1,369,317 | 2.46 | 11,398,120 | 677,654 | 6.32 | 20.004 |
| 1908..... | 63,702,873 | 6,723,668 | 11.80 | 8,413,876 | 2,984,244 | 26.18 | 13.208 |
| 1909*..... | 52,493,863 | | | 6,814,754 | | | 12.982 |
| 1910..... | 55,692,369 | 3,198,506 | 6.09 | 7,094,094 | 279,340 | 4.10 | 12.738 |
| 1911..... | 55,648,011 | (d) 44,358 | 0.79 | 6,886,998 | (d) 207,096 | 2.92 | 12.376 |
| 1912..... | 77,832,127 | 22,184,116 | 28.50 | 12,718,548 | 5,831,550 | 45.85 | 16.341 |
| 1913..... | 76,976,925 | (d) 855,202 | 1.10 | 11,753,606 | (d) 964,942 | 7.59 | 15.269 |
| 1914..... | 75,735,960 | (d) 1,240,965 | 1.64 | 10,301,606 | (d) 1,452,000 | 14.10 | 13.602 |

*The decrease is not as large as the figures would indicate because of the calculation of part of the 1909 production on a different basis from previous years. (See explanation in text).

In the case of British Columbia the metal is mainly derived from ores low in copper content, and since in smelting the copper, losses are necessarily high, running as high in some cases as 25 per cent and over, the difference between the copper content of the ore as shipped by the mine, and the metal recovered from the ore at the smelter, is considerable.

Statistics of the copper production for the years previous to 1909 include for British Columbia a record of the copper production in that Province as collected by the Provincial Bureau of Mines. These are compiled on the basis of the total metal content of the ores received at the smelters, for which smelter returns were received during the year, and show a relatively higher copper production than the figures published for the Province of Ontario, which are based on copper content of matte produced.

Since 1909 the method of compilation of statistics of copper production by the Provincial Bureau of Mines in British Columbia, provides for a deduction of five pounds of copper per ton of ore shipped on account of smelter losses, a method which gives a result closely approximating that obtained by this Branch.

Production of Copper by Provinces 1912, 1913, and 1914.

| Provinces. | 1912. | | 1913. | | 1914. | |
|-----------------------|------------|------------|------------|------------|------------|------------|
| | Lbs. | Value. | Lbs. | Value. | Lbs. | Value. |
| | | \$ | | \$ | | \$ |
| Quebec..... | 3,282,210 | 536,346 | 3,455,887 | 527,679 | 4,201,497 | 571,488 |
| Ontario..... | 22,250,601 | 3,635,971 | 25,885,929 | 3,952,522 | 28,948,211 | 3,937,536 |
| British Columbia..... | 50,526,656 | 8,256,561 | 45,791,579 | 6,991,916 | 41,219,202 | 5,606,636 |
| Other districts..... | *1,772,660 | 289,670 | *1,843,530 | 281,489 | †1,367,050 | 185,946 |
| Total..... | 77,832,127 | 12,718,548 | 76,976,925 | 11,753,606 | 75,735,960 | 10,301,606 |

*Includes Nova Scotia and Yukon. †Yukon only.

Prices:—The price of copper in New York varied between a maximum of 14·70 cents in February and a minimum of 11·05 cents in November. For three months following the declaration of war there were no market quotations. By the end of December prices had increased again to 13 cents.

Monthly Average Prices of Electrolytic Copper in New York.

(In cents per pound.)

| Months. | 1910. | 1911. | 1912. | 1913. | 1914. |
|---------------------|--------|--------|--------|--------|--------|
| | cts. | cts. | cts. | cts. | cts. |
| January..... | 13·620 | 12·295 | 14·094 | 16·488 | 14·223 |
| February..... | 13·332 | 12·256 | 14·084 | 14·971 | 14·491 |
| March..... | 13·255 | 12·139 | 14·698 | 14·713 | 14·131 |
| April..... | 12·733 | 12·019 | 15·741 | 15·291 | 14·211 |
| May..... | 12·550 | 11·989 | 16·031 | 15·436 | 13·996 |
| June..... | 12·404 | 12·385 | 17·234 | 14·672 | 13·603 |
| July..... | 12·215 | 12·463 | 17·190 | 14·190 | 13·223 |
| August..... | 12·490 | 12·405 | 17·498 | 15·400 | * |
| September..... | 12·379 | 12·201 | 17·508 | 16·328 | * |
| October..... | 12·553 | 12·189 | 17·314 | 16·337 | * |
| November..... | 12·742 | 12·616 | 17·326 | 15·182 | 11·739 |
| December..... | 12·581 | 13·552 | 17·376 | 14·224 | 12·801 |
| Yearly average..... | 12·738 | 12·376 | 16·341 | 15·269 | 13·602 |

*No quotations.

Monthly Average Prices of Standard Copper in London.

(In £ Sterling per ton of 2,240 pounds.)

| Months. | 1910. | 1911. | 1912. | 1913. | 1914. |
|---------------------|--------|--------|--------|--------|--------|
| | £ | £ | £ | £ | £ |
| January..... | 60·923 | 55·604 | 62·760 | 71·741 | 64·304 |
| February..... | 59·388 | 54·970 | 62·893 | 65·519 | 65·259 |
| March..... | 59·214 | 54·704 | 65·884 | 65·329 | 64·276 |
| April..... | 57·238 | 54·035 | 70·294 | 68·111 | 64·747 |
| May..... | 56·313 | 54·313 | 72·352 | 68·807 | 63·182 |
| June..... | 55·310 | 56·368 | 78·259 | 67·140 | 61·336 |
| July..... | 54·194 | 56·670 | 76·636 | 64·166 | 60·540 |
| August..... | 55·733 | 56·264 | 78·670 | 69·200 | * |
| September..... | 55·207 | 55·253 | 78·762 | 73·125 | * |
| October..... | 56·722 | 55·176 | 76·389 | 73·383 | * |
| November..... | 57·634 | 57·253 | 76·890 | 68·275 | 53·227 |
| December..... | 56·069 | 62·063 | 75·516 | 65·223 | 56·841 |
| Yearly average..... | 57·054 | 55·973 | 72·942 | 68·335 | 61·524 |

*No quotations.

With the exception of a small output of copper sulphate at Trail, B.C., the copper production of Canada is exported for refining. The exports of copper in ore, matte, regulus, etc., during the calendar year 1914 were 68,830,059 pounds valued at \$7,130,778, of which 57,923,363 pounds valued at \$6,287,439 were exported to the United States, and 10,906,696 pounds valued at \$843,339 to Great Britain. The exports of copper black or coarse and in pigs, to the United States amounted to 6,581,564 pounds valued at \$908,201. There was also an export of "old and scrap" copper amounting to 19,871 cwt. and valued at \$231,710, distributed as follows: to the United States 16,604 cwt. valued at \$189,793; to Great Britain, 2,751 cwt. valued at \$35,918; and to other countries 516 cwt. valued at \$5,999.

The following tables give, in detail, the exports for 1913 and 1914:—

Exports of Copper 1913 and 1914.

| 1914. | Fine in ore, matte, regulus, etc. | | Black or coarse and in pigs. | | "Old and Scrap." | |
|----------------------|-----------------------------------|--------------|------------------------------|--------------|------------------|--------------|
| | Pounds. | Value. \$ | Pounds. | Value. \$ | Cwt. | Value. \$ |
| United States..... | 57,923,363 | 6,287,439 | 6,581,564 | 908,201 | 16,604 | 189,793 |
| Great Britain..... | 10,906,696 | 843,339 | ..... | ..... | 2,751 | 35,918 |
| Other countries..... | ..... | ..... | ..... | ..... | 516 | 5,999 |
| Total..... | 68,830,059 | 7,130,778 | 6,581,564 | 908,201 | 19,871 | 231,710 |
| 1913. | | | | | | |
| United States..... | 76,552,312 | 9,079,167 | 771,280 | 123,431 | 18,432 | 237,678 |
| Great Britain..... | 5,325,468 | 400,163 | ..... | ..... | 6,071 | 80,647 |
| Other countries..... | 1,300 | 150 | ..... | ..... | 469 | 6,578 |
| Total..... | 81,879,080 | 9,479,480 | 771,280 | 123,431 | 24,972 | 324,903 |

Exports of Copper in Ore, Matte, etc., from 1885—1914.

| Calendar Year. | Lbs. | Value. | Calendar Year. | Lbs. | Value. |
|----------------|------------|-----------|----------------|------------|-----------|
| | | \$ | | | \$ |
| 1885..... | | 262,600 | 1900..... | 23,631,523 | 1,741,885 |
| 1886..... | | 249,259 | 1901..... | 32,488,872 | 3,404,908 |
| 1887..... | | 137,966 | 1902..... | 26,094,498 | 2,476,516 |
| 1888..... | | 257,260 | 1903..... | 38,364,676 | 3,873,827 |
| 1889..... | | 168,457 | 1904..... | 38,553,282 | 4,216,214 |
| 1890..... | | 398,497 | 1905..... | 40,740,861 | 5,443,873 |
| 1891..... | | 348,104 | 1906..... | 42,398,538 | 7,303,366 |
| 1892..... | | 277,632 | 1907..... | 54,688,450 | 8,749,609 |
| 1893..... | 4,792,201 | 269,160 | 1908..... | 51,136,371 | 5,934,559 |
| 1894..... | 1,625,389 | 91,917 | 1909..... | 54,447,750 | 5,832,246 |
| 1895..... | 3,742,352 | 236,965 | 1910..... | 56,964,127 | 5,840,553 |
| 1896..... | 5,462,052 | 281,070 | 1911..... | 55,287,710 | 5,467,725 |
| 1897..... | 14,022,610 | 850,336 | 1912..... | 78,488,564 | 9,036,479 |
| 1898..... | 11,572,381 | 840,243 | 1913*..... | 85,147,560 | 9,927,814 |
| 1899..... | 11,371,766 | 1,199,908 | 1914*..... | 77,398,723 | 8,270,689 |

*Includes "Old and Scrap."

The total imports of copper during the calendar year were valued at \$4,256,901 and included crude and manufactured copper to the extent of 26,280,815 pounds valued at \$3,983,322, copper sulphate 1,143,039 pounds valued at \$53,802, and other manufactures of copper valued at \$219,777.

In 1913 the total value of the imports was \$7,414,610 and included 41,011,961 pounds of crude and manufactured copper valued at \$6,935,822; copper sulphate 2,037,714 pounds valued at \$107,960; and other copper manufactures valued at \$370,828.

Imports of Copper 1913 and 1914.

| | 1913. | | 1914. | |
|--|------------|-----------|------------|-----------|
| | Pounds. | Value. | Pounds. | Value. |
| | | \$ | | \$ |
| Copper, old and scrap..... | 596,700 | 87,790 | 127,800 | 15,717 |
| Copper in pigs, ingots or in blocks..... | 5,314,200 | 845,095 | 3,733,300 | 507,499 |
| Copper in bars, and rods, in coils, or otherwise, in lengths, not less than 6 feet, unmanufactured | 29,387,900 | 4,886,846 | 18,212,300 | 2,689,940 |
| Copper, in strips, sheets or plates, not planished or coated, etc..... | 4,255,900 | 782,974 | 3,373,100 | 574,783 |
| Copper tubing in lengths not less than 6 feet and not polished, bent or otherwise manufactured.... | 884,920 | 205,797 | 696,444 | 159,602 |
| Copper rollers, for use in calico printing..... | 11,704 | 11,704 | ..... | 22,301 |
| Copper and Manufactures of:— | | | | |
| Nails, tacks, rivets and burrs or washers..... | ..... | 3,479 | ..... | 4,445 |
| Wire, plain, tinned or plated..... | 572,341 | 127,320 | 137,871 | 35,781 |
| Wire cloth, etc..... | ..... | 5,844 | ..... | 4,433 |
| All other manufactures of, n.o.p..... | ..... | 349,286 | ..... | 188,270 |
| Copper precipitate of crude..... | 4,743 | 515 | 2,017 | 328 |
| Copper sulphate..... | 2,037,714 | 107,960 | 1,143,039 | 53,802 |
| Total value..... | ..... | 7,414,610 | ..... | 4,256,901 |

Imports of Copper 1910 to 1914 inclusive.

| Year. | Pigs, ingots or in blocks. | | Old and scrap. | | Manufactures of copper. | | | | Crude precipitate. | | Copper sulphate. | | Total value. |
|-----------|----------------------------|---------|----------------|--------|------------------------------------|-----------|--------------------------|-------|--------------------|-----------|------------------|-----------|--------------|
| | | | | | Bars, rods, sheets, tube and wire. | | Other manu- factures. | | | | | | |
| | | | | | | | | | | | | | |
| | | | | | | | | | | | | | |
| | Lbs. | \$ | Lbs. | \$ | Lbs. | \$ | Lbs. | \$ | Lbs. | \$ | | | |
| 19 0..... | 4,640,500 | 609,111 | 273,700 | 31,070 | 25,322,906 | 3,579,270 | 150,322 | 4,847 | 595 | 1,925,557 | 77,782 | 4,448,150 | |
| 1911..... | 5,650,400 | 705,598 | 265,300 | 28,748 | 29,244,210 | 3,898,416 | 215,289 | 2,608 | 299 | 2,191,899 | 88,419 | 4,936,769 | |
| 1912..... | 5,121,800 | 806,705 | 400,500 | 56,748 | 35,198,208 | 5,776,003 | 305,680 | 5,703 | 570 | 2,105,419 | 101,650 | 7,047,356 | |
| 1913..... | 5,314,200 | 845,095 | 596,700 | 87,790 | 35,101,061 | 6,002,937 | 370,313 | 4,743 | 515 | 2,037,714 | 107,960 | 7,414,610 | |
| 1914..... | 3,733,300 | 507,499 | 127,800 | 15,717 | 22,419,715 | 3,460,106 | 219,449 | 2,017 | 328 | 1,143,039 | 53,802 | 4,256,901 | |

Copper:—Imports of Pigs, Old Scrap, etc.

| Fiscal Year. | Lbs. | Value. | Fiscal Year. | Lbs. | Value. |
|--------------|---------|--------|--------------------|-----------|---------|
| | | \$ | | | \$ |
| 1880..... | 31,900 | 2,130 | 1898..... | 1,050,000 | 80,000 |
| 1881..... | 9,800 | 1,157 | 1899..... | 1,655,000 | 246,740 |
| 1882..... | 20,200 | 1,984 | 1900..... | 1,144,000 | 180,990 |
| 1883..... | 124,500 | 20,273 | 1901..... | 951,500 | 152,274 |
| 1884..... | 40,200 | 3,180 | 1902..... | 1,767,200 | 325,832 |
| 1885..... | 28,600 | 2,016 | 1903..... | 2,038,400 | 252,594 |
| 1886..... | 82,000 | 6,969 | 1904..... | 2,115,300 | 270,315 |
| 1887..... | 40,100 | 2,507 | 1905..... | 1,944,400 | 266,548 |
| 1888..... | 32,300 | 2,322 | 1906..... | 2,627,700 | 441,854 |
| 1889..... | 32,300 | 3,288 | 1907 (9 mos.)..... | 2,616,600 | 520,971 |
| 1890..... | 112,200 | 11,521 | 1908..... | 3,612,400 | 650,597 |
| 1891..... | 107,800 | 10,452 | 1909..... | 2,732,300 | 383,441 |
| 1892..... | 343,600 | 14,894 | Calendar year. | | |
| 1893..... | 168,300 | 16,331 | 1910..... | 4,914,200 | 640,181 |
| 1894..... | 101,200 | 7,397 | 1911..... | 5,915,700 | 734,346 |
| 1895..... | 72,062 | 6,770 | 1912..... | 5,522,300 | 863,453 |
| 1896..... | 86,905 | 9,226 | 1913..... | 5,910,900 | 932,885 |
| 1897..... | 49,000 | 5,449 | 1914..... | 3,861,100 | 523,216 |

Imports of Manufactures of Copper.

| Fiscal Year. | Value. | Fiscal Year. | Value. | Fiscal Year. | Value. |
|--------------|---------|--------------|-----------|--------------------|-----------|
| | \$ | | \$ | | \$ |
| 1880..... | 123,061 | 1892..... | 422,870 | 1904..... | 1,191,610 |
| 1881..... | 159,163 | 1893..... | 458,715 | 1905..... | 1,775,881 |
| 1882..... | 220,235 | 1894..... | 175,404 | 1906..... | 2,660,303 |
| 1883..... | 247,141 | 1895..... | 251,615 | 1907 (9 mos.)..... | 2,545,600 |
| 1884..... | 134,534 | 1896..... | 285,220 | 1908..... | 2,713,060 |
| 1885..... | 181,469 | 1897..... | 264,587 | 1909..... | 2,086,205 |
| 1886..... | 219,420 | 1898..... | 786,529 | Calendar year. | |
| 1887..... | 325,365 | 1899..... | 551,586 | 1910..... | 3,729,592 |
| 1888..... | 303,459 | 1900..... | 1,090,280 | 1911..... | 4,113,395 |
| 1889..... | 402,216 | 1901..... | 951,045 | 1912..... | 6,081,464 |
| 1890..... | 472,668 | 1902..... | 1,281,522 | 1913..... | 6,373,250 |
| 1891..... | 563,522 | 1903..... | 1,291,635 | 1914..... | 3,679,555 |

Quebec.

The mines of the Eastern Townships were still more active during 1914 with an increased copper production therefrom. This amounted to 4,206,497 pounds, valued at \$571,488, representing the estimated recovery from 117,699 tons of ore and concentrates. Statistics of the copper production of Quebec province since 1886 are shown in the table following:—

Quebec:—Production of Copper.

| Calendar Year. | Lbs. | Value. | Calendar Year. | Lbs. | Value. |
|----------------|-----------|---------|----------------|-----------|---------|
| | | \$ | | | \$ |
| 1886..... | 3,340,000 | 367,400 | 1901..... | 1,527,442 | 246,178 |
| 1887..... | 2,937,900 | 330,514 | 1902..... | 1,640,000 | 190,666 |
| 1888..... | 5,562,864 | 927,107 | 1903..... | 1,152,000 | 152,467 |
| 1889..... | 5,315,000 | 730,813 | 1904..... | 760,000 | 97,455 |
| 1890..... | 4,710,606 | 741,920 | 1905..... | 1,621,243 | 252,752 |
| 1891..... | 5,401,704 | 695,469 | 1906..... | 1,981,169 | 381,930 |
| 1892..... | 4,883,480 | 564,042 | 1907..... | 1,517,990 | 303,659 |
| 1893..... | 4,468,352 | 480,348 | 1908..... | 1,282,024 | 169,330 |
| 1894..... | 2,176,430 | 208,067 | 1909..... | 1,088,212 | 141,272 |
| 1895..... | 2,242,462 | 241,288 | 1910..... | 877,347 | 111,757 |
| 1896..... | 2,407,200 | 261,903 | 1911..... | 2,436,190 | 301,503 |
| 1897..... | 2,474,970 | 279,424 | 1912..... | 3,282,210 | 536,346 |
| 1898..... | 2,100,235 | 252,658 | 1913..... | 3,455,887 | 527,679 |
| 1899..... | 1,632,560 | 287,494 | 1914..... | 4,201,497 | 571,488 |
| 1900..... | 2,220,000 | 359,418 | | | |

Ontario.

The copper production from Ontario comes mainly from the nickel-copper ores of Sudbury district.

The chief companies are: The Canadian Copper Co., Limited, shipping from the Creighton, Crean Hill, the No. 2 and the No. 3, or Frood mines; and the Mond Nickel Co., Limited, operating the Garson, Victoria No. 1, North Star and Worthington. The Alexo mine, near Porquis Junction, on the Timiskaming and Northern Ontario Railway, shipped a considerable tonnage of nickel-copper ore to the Mond Nickel Company's smelter.

The British America Nickel Corporation did some development work at the Murray and Whistle mines, but made no production.

A small shipment was made of copper ore from Dane to United States smelters, and payments were made for a small amount of copper in shipments from the Cobalt district to American smelters.

The total tonnage of nickel-copper ores smelted in 1914 was 947,053 tons. There were produced during the year 46,396 tons of bessemer matte, containing 14,448 tons of copper and 22,759 tons of nickel, the shipping value of the matte being approximately \$7,189,031. Details of the production of these ores are given more completely and in tabular form in the article on "Nickel."

The Ontario Government offers a bounty on copper over 95 per cent pure metal, and on copper-sulphate produced from ore mined and refined in the Province. The text of the Act will be found in the chapter on cobalt under the heading "Metal Refining Bounty Act."

Statistics of the copper production of Ontario since 1886 are given in the table following:—

Ontario:—Production of Copper.

| Calendar Year. | Lbs. | Value. | Calendar Year. | Lbs. | Value. |
|----------------|-----------|-----------|----------------|------------|-----------|
| | | \$ | | | \$ |
| 1886..... | 165,000 | 18,150 | 1901..... | 8,695,831 | 1,401,507 |
| 1887..... | 322,524 | 36,284 | 1902..... | 7,408,202 | 861,278 |
| 1888..... | Nil. | Nil. | 1903..... | 7,172,533 | 949,285 |
| 1889..... | 1,466,752 | 201,678 | 1904..... | 4,913,594 | 630,070 |
| 1890..... | 1,303,065 | 205,233 | 1905..... | 8,779,259 | 1,368,686 |
| 1891..... | 4,127,697 | 531,234 | 1906..... | 10,638,231 | 2,050,838 |
| 1892..... | 2,203,795 | 254,538 | 1907..... | 14,104,337 | 2,821,432 |
| 1893..... | 3,641,504 | 391,461 | 1908..... | 15,005,171 | 1,981,883 |
| 1894..... | 5,207,679 | 497,854 | 1909..... | 15,746,699 | 2,044,237 |
| 1895..... | 4,576,337 | 492,414 | 1910..... | 19,259,016 | 2,453,213 |
| 1896..... | 3,167,256 | 344,598 | 1911..... | 17,932,263 | 2,219,297 |
| 1897..... | 5,500,652 | 621,023 | 1912..... | 22,250,601 | 3,635,971 |
| 1898..... | 8,375,223 | 1,007,539 | 1913..... | 25,885,929 | 3,952,522 |
| 1899..... | 5,723,324 | 1,007,877 | 1914..... | 28,948,211 | 3,937,536 |
| 1900..... | 6,740,058 | 1,091,215 | | | |

British Columbia.

According to returns received from the smelters, the total quantity of copper contained in matte, blister, and copper-sulphate produced in British Columbia during 1914, and including an estimate of smelter recovery for copper ores exported, was 41,219,202 pounds, after deducting the amount of copper produced from foreign ores. The production of 1913 on a similar basis was 43,791,579 pounds, and in 1912—50,526 656 pounds.

Returns of smelter production in this Province were not collected by this Department previous to 1908, and a complete record of statistics of production on this basis is not available.

The production of copper in this Province, according to statistics collected and published by the Provincial Department of Mines, reached a total of 45,009,699 pounds in 1914, as compared with 46,460,305 pounds in 1913. Statistics of the annual production since 1894, as ascertained by the Provincial Department of Mines, and the production by districts since 1908 are shown in the tables following:—

British Columbia:—Copper Content of Ores Shipped.†

| Calendar Year. | COPPER CON- TAINED IN ORES SHIPPED. | INCREASE. | | Value. |
|----------------|---|------------|--------|-----------|
| | Lbs. | Lbs. | % | |
| 1894..... | 324,680 | | | \$ |
| 1895..... | 952,840 | 628,160 | 193·00 | 31,039 |
| 1896..... | 3,818,556 | 2,865,716 | 301·00 | 102,526 |
| 1897..... | 5,325,180 | 1,506,624 | 39·00 | 415,459 |
| 1898..... | 7,271,678 | 1,946,498 | 36·00 | 601,213 |
| 1899..... | 7,722,591 | 450,913 | 6·00 | 874,783 |
| 1900..... | 9,977,080 | 2,254,489 | 29·00 | 1,359,948 |
| 1901..... | 27,603,746 | 17,626,666 | 177·00 | 1,615,289 |
| 1902..... | 29,636,057 | 2,032,311 | 7·00 | 4,448,896 |
| 1903..... | 34,359,921 | 4,723,864 | 16·00 | 3,445,488 |
| 1904..... | 35,710,128 | 1,350,207 | 3·7 | 4,547,735 |
| 1905..... | 37,602,251 | 1,982,123 | 5·6 | 4,579,110 |
| 1906..... | 42,990,488 | 5,298,237 | 14·1 | 5,876,222 |
| 1907..... | 40,832,720 | *2,157,768 | *5·02 | 8,287,706 |
| 1908..... | 47,274,614 | 6,441,894 | 15·8 | 8,168,177 |
| 1909..... | 45,597,245 | *1,677,369 | *3·6 | 6,244,031 |
| 1910†..... | 38,243,934 | | | 5,871,522 |
| 1911†..... | 36,927,656 | *1,316,278 | *3·4 | 4,871,512 |
| 1912†..... | 51,546,537 | 14,618,881 | 39·6 | 4,571,644 |
| 1913†..... | 46,460,305 | *4,996,232 | 9·7 | 8,408,513 |
| 1914†..... | 45,009,699 | *1,450,606 | 3·1 | 7,094,489 |
| | | | | 6,121,319 |

* Decrease. †As published by British Columbia Bureau of Mines. ‡Allowing 5 pounds copper per ton of ore for smelter losses.

British Columbia:—Production of Copper by Districts.

| | 1909.* | 1910.† | 1911.† | 1912.† | 1913.† | 1914.† |
|----------------------|------------|------------|------------|------------|------------|------------|
| | Lbs. | Lbs. | Lbs. | Lbs. | Lbs. | Lbs. |
| Cariboo..... | | | | | 1,838 | 6,000 |
| Cassiar..... | 137,651 | | 19,151 | 88,403 | 1,336 | 11,123,376 |
| West Kootenay— | | | | | | |
| Nelson..... | 186,572 | 231,936 | | 26,257 | 815,126 | 586,764 |
| Trail creek..... | 3,509,909 | 3,577,745 | 3,429,702 | 2,539,900 | 2,538,661 | 3,779,830 |
| Yale— | | | | | | |
| Boundary..... | 40,603,042 | 31,354,985 | 22,327,359 | 33,372,199 | 28,621,973 | 16,428,959 |
| Ashcroft | | | | | | |
| Kamloops | | 1,178 | 152,723 | | 37,578 | 14,525 |
| Coast districts..... | 1,160,071 | 3,078,090 | 10,998,721 | 15,429,778 | 14,443,793 | 13,070,245 |
| Totals..... | 45,597,245 | 38,243,934 | 36,927,656 | 51,456,537 | 46,460,305 | 45,009,699 |

*Copper content of ores shipped. †After deducting five pounds of copper per ton of ore for slag losses.

According to the direct returns in 1914, the ores of the Boundary district produced 42·9 per cent of the total against 63·5 per cent of the total for 1913; the Trail Creek and Nelson divisions came in for about 11·3 per cent; and the Coast and Cassiar districts for 45·8 per cent—compared with 29·8 per cent of the total for 1913.

In the Boundary the production was mainly from the mines of three of the large smelting companies; the Granby Consolidated Mining, Smelting and Power Co., Limited; the British Columbia Copper Co., Limited, and the New Dominion Copper Co., Limited. The two first named operate their own smelters and convert their matte to blister copper. The low grade

ores of this district are self-fluxing and very uniform in character, averaging a little over 1 per cent in copper, and from \$1 to \$2 in gold and silver.

The chief producing mines of the district were the Granby mines at Phoenix, the Mother Lode of the British Columbia Copper Company at Deadwood, and Rawhide of the New Dominion Copper Company, near Phoenix.

The British Columbia Copper Company have been steadily developing their properties at Princess Camp in the Similkameen, employing a large number of men. The properties were producing during 1914 and we may look forward to the eventual establishment in that part of the country of another important copper producing centre.

In the interior the main shippers were, at Rossland, the Centre Star, Le Roi groups, owned by the Consolidated Mining and Smelting Co., and the Le Roi II (Josie) mine. Besides these, shipments were made from the Nelson district by the Queen Victoria mine of the British Columbia Copper Co., and the Silver King of the Consolidated Mining and Smelting Company.

Much development was done in the neighbourhood of New Hazelton in the Omineca mining division.

The Montana Continental Development Co., did extensive improvements and much work on the Rocher de Boule property, and will likely be an important producer in 1915.

The decrease in production in the Boundary district was more than offset by the large increase in production of the Coast district, which now ranks as the principal producer of copper ores in British Columbia with heavy shipments from the Hidden Creek mine on Observatory inlet; the Britannia mines on Howe Sound and the Marble Bay mines on Texada island.

Yukon.

The main shipments from this Territory were from the Pueblo mine at Whitehorse. Some smaller properties also shipped, and the owners of the Pueblo have re-opened the War Eagle in the same neighbourhood.

GOLD.

The production of gold in Canada in 1914 reached a total of 773,178 fine ounces valued at \$15,983,007 as compared with 802,973 fine ounces valued at \$16,598,923 in 1913. The production was made up as follows: (a) gold derived from alluvial workings \$5,687,501 or 35·6 per cent of the total; (b) gold obtained from the crushing of free milling quartz ores, i. e. stamp mill bullion \$6,051,968, or 37·9 per cent; and (c) gold obtained from ores and concentrates sent to the copper and lead smelters \$4,243,538 or 26·5 per cent of the total production.

Statistics of the annual gold production of Canada are shown in the following table:—

Annual Production of Gold in Canada, 1858-1914.

| Calendar Year. | Ozs. (fine†) | Value. | Calendar Year. | Ozs. (fine†) | Value. |
|----------------|--------------|-----------|----------------|--------------|------------|
| | | \$ | | | \$ |
| 1858..... | 34,104 | 705,000 | 1886..... | 70,782 | 1,463,196 |
| 1859..... | 78,129 | 1,615,072 | 1887..... | 57,460 | 1,187,804 |
| 1860..... | 107,806 | 2,228,543 | 1888..... | 53,145 | 1,098,610 |
| 1861..... | 128,973 | 2,666,118 | 1889..... | 62,653 | 1,295,159 |
| 1862..... | 135,391 | 2,798,774 | 1890..... | 55,620 | 1,149,776 |
| 1863..... | 202,498 | 4,186,011 | 1891..... | 45,018 | 930,614 |
| 1864..... | 199,605 | 4,126,199 | 1892..... | 43,905 | 907,601 |
| 1865..... | 192,898 | 3,987,562 | 1893..... | 47,243 | 976,603 |
| 1866..... | 152,555 | 3,153,597 | 1894..... | 54,600 | 1,128,688 |
| 1867..... | 145,775 | 3,013,431 | 1895..... | 100,798 | 2,083,674 |
| 1868..... | 134,169 | 2,773,527 | 1896..... | 133,262 | 2,754,774 |
| 1869..... | 102,720 | 2,123,405 | 1897..... | 291,557 | 6,027,016 |
| 1870..... | 83,415 | 1,724,348 | 1898..... | 666,386 | 13,775,420 |
| 1871..... | 105,187 | 2,174,412 | 1899..... | 1,028,529 | 21,261,584 |
| 1872..... | 90,283 | 1,866,321 | 1900..... | 1,350,057 | 27,908,153 |
| 1873..... | 74,346 | 1,536,871 | 1901..... | 1,167,216 | 24,128,503 |
| 1874..... | 97,856 | 2,022,862 | 1902..... | 1,032,161 | 21,336,667 |
| 1875..... | 130,300 | 2,693,533 | 1903..... | 911,559 | 18,843,590 |
| 1876..... | 97,729 | 2,020,233 | 1904..... | 796,374 | 16,462,517 |
| 1877..... | 94,304 | 1,949,444 | 1905..... | 684,951 | 14,159,195 |
| 1878..... | 74,420 | 1,538,394 | 1906..... | 556,415 | 11,502,120 |
| 1879..... | 76,547 | 1,582,358 | 1907..... | 405,517 | 8,382,780 |
| 1880..... | 63,121 | 1,304,824 | 1908..... | 476,112 | 9,842,105 |
| 1881..... | 63,524 | 1,313,153 | 1909..... | 453,865 | 9,382,230 |
| 1882..... | 60,288 | 1,246,268 | 1910..... | 493,707 | 10,205,835 |
| 1883..... | 53,853 | 1,113,246 | 1911..... | 473,159 | 9,781,077 |
| 1884..... | 51,202 | 1,058,439 | 1912..... | 611,885 | 12,648,794 |
| 1885..... | 55,575 | 1,148,829 | 1913..... | 802,973 | 16,598,923 |
| | | | 1914..... | 773,178 | 15,983,007 |

†Calculated from the value: one dollar = 0·048375 oz.

Gold was first discovered in various provinces about 1858 and the production gradually increased, reaching over four million dollars in 1863, to decrease again, so that in 1892 the production amounted only to \$907,601. The discovery of gold in the Yukon and other discoveries in 1896 gave the mining industry a new impetus, resulting in a rapid increase in the gold production, which, in 1900, reached the high mark of nearly twenty million

dollars, from which it decreased again until 1907, and after a stationary period around the ten million mark, with the discovery of the Porcupine mines in Ontario, it has rapidly increased again, suffering a slight decrease in 1914, due to the unsettled conditions caused by the European war.

The imports during the calendar year 1914 were: gold bullion valued at \$14,534,482; gold coins \$117,700,824; and manufactures of gold and silver valued at \$614,043.

The exports of gold in dust, nuggets, etc., during the same period were valued at \$15,242,200.

Refined Metal:—The Dominion Assay Office in Vancouver, operated in connexion with this Department, receives, assays, and purchases crude bullion, amalgam, nuggets, and dust, the resultant bullion being re-sold. The total quantity of bullion thus received during the twelve months ending December 31, 1914 was 163,523·61 ounces, being the weight after melting, valued at \$2,029,251.31, after deducting office charges.

A refinery is in operation at the Royal Mint at Ottawa and shipments of gold have been received from various provinces.

There is but one other refinery in Canada producing fine gold; that of the Consolidated Mining and Smelting Co. of Canada, Limited, at Trail, B.C., where the gold is mainly recovered from the high grade silver-lead ores and the "dry" ores shipped to the smelter. Its annual output is given below.

Production of Refined Gold at Trail, B.C.

| Year | Ozs. | Year. | Ozs. | Year. | Ozs. |
|-----------|--------|-----------|--------|-----------|--------|
| 1904..... | 4,336 | 1908..... | 15,346 | 1912..... | 12,118 |
| 1905..... | 8,602 | 1909..... | 18,241 | 1913..... | 11,977 |
| 1906..... | 9,993 | 1910..... | 13,298 | 1914..... | 11,088 |
| 1907..... | 10,395 | 1911..... | 15,270 | | |

The production of gold by provinces is shown in the following table:—

Production of Gold by Provinces, 1912, 1913, and 1914.

| | 1912. | | 1913. | | 1914. | |
|-----------------------|--------------|------------|--------------|------------|--------------|------------|
| | Ozs. (fine‡) | Value. | Ozs. (fine‡) | Value. | Ozs. (fine‡) | Value. |
| | | \$ | | \$ | | \$ |
| Nova Scotia..... | 4,385 | 90,638 | 2,174 | 44,935 | 2,904 | 60,031 |
| Quebec..... | 642 | 13,270 | 701 | 14,491 | 1,292 | 26,708 |
| Ontario..... | 86,523 | 1,788,596 | 219,801 | 4,543,690 | 268,264 | 5,545,509 |
| Alberta..... | 73 | 1,509 | | | 48 | 992 |
| British Columbia..... | (a) 251,815 | 5,205,485 | (a) 297,459 | 6,149,027 | (a) 252,730 | 5,224,393 |
| Yukon..... | 268,447 | 5,549,296 | 282,838 | 5,846,780 | 247,940 | 5,125,374 |
| Totals..... | 611,885 | 12,648,794 | 802,973 | 16,598,923 | 773,178 | 15,983,007 |

‡Calculated from the value: one dollar = 0.048375 oz.

| | 1912. | 1913. | 1914. |
|--|-----------|-----------|-----------|
| | \$ | \$ | \$ |
| (a) As follows: Gold from placer mining..... | 555,500 | 510,000 | 565,000 |
| Gold from vein mining..... | 4,649,985 | 5,639,027 | 4,659,393 |
| | 5,205,485 | 6,149,027 | 5,224,393 |

The exact value of fine gold is $\frac{999}{1000}$ dollars per ounce equivalent to \$20.671834. (United States Standard.) In most cases, statistics of gold production are stated as crude bullion with value thereof. The fine ounces given in the tables in this report are calculated from the values by multiplying these by $\frac{999}{1000}$ or 0.048375.

Nova Scotia.

The gold production of this Province, which is derived almost entirely from quartz ores, is reported by the Provincial Department of Mines as 2,904 fine ounces valued at \$60,031, compared with 2,174 fine ounces valued at \$44,935 for the year 1913; i.e., an increase of 33 per cent.

The production of Nova Scotia, which was 6,863 fine ounces in 1862, reached a maximum of 30,348 fine ounces in 1902; then decreased gradually, reaching in 1913 a minimum of 2,174 fine ounces.

Statistics of the annual production since 1862 are given in the following table:—

Nova Scotia:—Annual Production of Gold.

| Cal. Year. | Tons. treated. | Ozs. (fine). | Value. | Yield of gold per ton. | Cal. Year. | Tons. treated. | Ozs. (fine). | Value. | Yield of gold per ton. |
|------------|----------------|--------------|---------|------------------------|------------|----------------|--------------|---------|------------------------|
| | | | \$ | \$ | | | | \$ | \$ |
| 1862..... | 6,473 | 6,863 | 141,871 | 21.91 | 1888.. | 36,178 | 21,137 | 436,939 | 12.08 |
| 1863..... | 17,000 | 13,180 | 272,448 | 16.02 | 1889.. | 39,160 | 24,673 | 510,029 | 13.02 |
| 1864..... | 21,431 | 18,883 | 390,349 | 18.21 | 1890.. | 42,749 | 22,978 | 474,990 | 11.11 |
| 1865..... | 24,421 | 24,011 | 496,357 | 20.32 | 1891.. | 36,351 | 21,841 | 451,503 | 12.42 |
| 1866..... | 32,157 | 23,776 | 491,491 | 15.28 | 1892.. | 32,552 | 18,865 | 389,965 | 11.98 |
| 1867..... | 31,384 | 25,763 | 532,563 | 16.96 | 1893.. | 42,354 | 18,436 | 381,095 | 8.99 |
| 1868..... | 32,259 | 19,377 | 400,555 | 12.41 | 1894.. | 55,357 | 18,834 | 389,338 | 7.04 |
| 1869..... | 35,144 | 16,855 | 348,427 | 19.91 | 1895.. | 60,600 | 21,919 | 453,119 | 7.47 |
| 1870..... | 30,824 | 18,740 | 387,392 | 12.56 | 1896.. | 69,169 | 23,876 | 493,568 | 7.13 |
| 1871..... | 30,787 | 18,139 | 374,972 | 12.17 | 1897.. | 73,192 | 27,195 | 562,165 | 7.68 |
| 1872..... | 17,089 | 12,352 | 255,349 | 14.94 | 1898.. | 82,747 | 26,054 | 538,590 | 6.50 |
| 1873..... | 17,708 | 11,180 | 231,122 | 13.05 | 1899.. | 112,226 | 29,876 | 617,604 | 5.50 |
| 1874..... | 13,844 | 8,623 | 178,244 | 12.87 | 1900.. | 87,390 | 28,955 | 598,553 | 6.85 |
| 1875..... | 14,810 | 10,576 | 218,629 | 14.76 | 1901.. | 91,948 | 26,459 | 546,963 | 5.32 |
| 1876..... | 15,490 | 11,300 | 233,585 | 15.08 | 1902.. | 93,042 | 30,348 | 627,357 | 6.68 |
| 1877..... | 17,369 | 15,925 | 329,205 | 18.95 | 1903.. | 103,856 | 25,533 | 527,806 | 5.08 |
| 1878..... | 17,989 | 11,864 | 245,253 | 13.63 | 1904.. | 45,436 | 10,362 | 214,209 | 4.71 |
| 1879..... | 15,936 | 12,980 | 268,328 | 16.83 | 1905.. | 57,774 | 13,707 | 283,353 | 4.90 |
| 1880..... | 13,997 | 12,472 | 257,823 | 18.42 | 1906.. | 66,059 | 12,223 | 252,676 | 3.82 |
| 1881..... | 16,556 | 10,147 | 209,755 | 12.66 | 1907.. | 58,550 | 13,675 | 282,686 | 4.82 |
| 1882..... | 21,081 | 13,307 | 275,090 | 13.04 | 1908.. | 61,536 | 11,842 | 244,799 | 3.97 |
| 1883..... | 25,954 | 14,571 | 301,207 | 11.60 | 1909.. | 56,790 | 10,193 | 210,711 | 3.71 |
| 1884..... | 25,186 | 15,168 | 313,554 | 12.44 | 1910.. | 43,006 | 7,928 | 163,891 | 3.81 |
| 1885..... | 28,890 | 20,945 | 432,971 | 14.98 | 1911.. | 18,328 | 7,781 | 160,854 | 8.78 |
| 1886..... | 29,010 | 22,038 | 455,564 | 15.70 | 1912.. | 14,360 | 4,385 | 90,638 | 6.51 |
| 1887..... | 32,280 | 20,009 | 413,631 | 12.81 | 1913.. | 7,324 | 2,174 | 44,935 | 6.13 |
| | | | | | 1914.. | 13,156 | 2,904 | 60,031 | 4.56 |

Total fine ounces gold..... 893,197
Total value..... \$18,464,102

The production of gold by districts during the twelve months ending September 30, 1914, as collected and published by the Provincial Mines Department, and the production from 1862 to 1914, by districts, according to the same authority, are shown in tabular form, as follows:—

Nova Scotia:—District Details of Gold Production, Year Ending September 30, 1914.

| District. | Tons crushed. | TOTAL YIELD OF GOLD. | | | AVERAGE YIELD OF GOLD PER TON. | | |
|----------------------------|---------------|----------------------|------|------|--------------------------------|------|------|
| | | oz. | dwt. | grs. | oz. | dwt. | grs. |
| Caribou..... | 789 | 483 | 10 | 2 | ..... | 12 | 6 |
| Caribou (Moose River)..... | 405 | 94 | 13 | 0 | ..... | 4 | 16 |
| Fifteen Mile Brook..... | 120 | 44 | 15 | 18 | ..... | 7 | 11 |
| Lake Catcha..... | 1,106 | 387 | 13 | 23 | ..... | 7 | 0 |
| Millers Lake..... | 6 | 1 | 6 | 0 | ..... | 4 | 8 |
| Montagu..... | 118 | 40 | 12 | 23 | ..... | 6 | 21 |
| Oldham..... | 358 | 182 | 10 | 0 | ..... | 10 | 5 |
| Sherbrooke..... | 6,806 | 895 | 14 | 0 | ..... | 2 | 15 |
| Stormont..... | 2,257 | 707 | 14 | 0 | ..... | 6 | 7 |
| Tangier..... | 416 | 56 | 17 | 3 | ..... | 2 | 18 |
| Wagamatkook..... | 775 | 262 | 17 | 13 | ..... | 6 | 19 |
| Totals..... | 13,156 | 3,158 | 4 | 10 | ..... | 4 | 19 |

Nova Scotia:—Production of Gold from 1862 to 1914.

| District. | Tons crushed. | TOTAL YIELD OF GOLD. | | | AVERAGE YIELD OF GOLD PER TON. | | | Valued at \$19 per oz. |
|-------------------------------------|------------------|----------------------|------|------|-----------------------------------|------|------|---------------------------|
| | | oz. | dwt. | grs. | oz. | dwt. | grs. | |
| | | | | | | | | \$ |
| *Caribou and Moose River..... | 222,233 | 61,319 | 11 | 14 | ..... | 5 | 12 | 1,165,072 |
| Montagu..... | 29,740 | 42,232 | 12 | 8 | ..... | 1 | 8 | 802,420 |
| Oldham..... | 59,348 | 67,687 | 18 | 22 | ..... | 1 | 2 | 1,286,071 |
| Renfrew..... | 61,795 | 48,699 | 7 | 19 | ..... | 15 | 18 | 925,288 |
| Sherbrooke..... | 307,019 | 153,985 | 15 | 4 | ..... | 10 | 1 | 2,925,729 |
| Stormont..... | 527,514 | 121,265 | 18 | 13 | ..... | 4 | 14 | 2,304,053 |
| Tangier..... | 67,428 | 28,965 | 8 | 12 | ..... | 8 | 14 | 550,343 |
| †Uniacke..... | 63,351 | 43,983 | 1 | 17 | ..... | 13 | 21 | 835,679 |
| Waverley..... | 155,520 | 69,980 | 10 | 16 | ..... | 9 | 0 | 1,329,630 |
| ††Brookfield..... | 93,527 | 38,709 | 2 | 2 | ..... | 8 | 7 | 735,473 |
| †††Salmon River..... | 118,819 | 41,852 | 5 | 20 | ..... | 7 | 1 | 795,193 |
| †††Whiteburn..... | 6,907 | 9,800 | 0 | 2 | ..... | 1 | 8 | 186,200 |
| Lake Catcha..... | 31,928 | 28,209 | 14 | 17 | ..... | 17 | 16 | 535,985 |
| ¶Rawdon..... | 12,189 | 9,606 | 5 | 10 | ..... | 15 | 18 | 182,519 |
| Wine Harbour..... | 77,396 | 34,992 | 15 | 11 | ..... | 9 | 1 | 664,863 |
| **Fifteenmile Stream..... | 36,878 | 17,363 | 0 | 5 | ..... | 9 | 10 | 329,897 |
| Malaga Barrens..... | 22,926 | 20,305 | 12 | 6 | ..... | 17 | 17 | 385,807 |
| §West Gore (from Stibnite ore)..... | 3,240 | 4,512 | 15 | 10 | ..... | 1 | 7 | 85,743 |
| Other districts..... | 145,836 | 75,670 | 2 | 5 | ..... | 10 | 9 | 1,437,846 |
| | 2,043,594 | 919,147 | 18 | 21 | ..... | 9 | 0 | 17,463,811 |

*From 1869, †from 1868, ‡from 1887, ††from 1883, †††from 1882, ¶from 1887, **from 1883, §from 1905.

Quebec.

The gold production in Quebec during 1914 was 1,292 fine ounces valued at \$26,708, against 701 fine ounces valued at \$14,491, in 1913, an increase of 84 per cent. This production is derived from the pyritic mines of the Eastern Townships, which are worked chiefly for the sulphur and copper contents of the ore.

No alluvial production has been reported for the last two years. The following table gives the production for Quebec from 1877 to 1914:—

Quebec:—Annual Production of Gold.

| Calendar Year. | Ozs. (fine*). | Value. | Calendar Year. | Ozs. (fine*). | Value. |
|----------------|---------------|--------|----------------|---------------|---------|
| | | \$ | | | \$ |
| 1877..... | 583 | 12,057 | 1896..... | 145 | 3,000 |
| 1878..... | 868 | 17,937 | 1897..... | 44 | 900 |
| 1879..... | 1,160 | 23,972 | 1898..... | 295 | 6,089 |
| 1880..... | 1,605 | 33,174 | 1899..... | 238 | 4,916 |
| 1881..... | 2,741 | 56,661 | 1900..... | Nil. | Nil. |
| 1882..... | 827 | 17,093 | 1901..... | 145 | 3,000 |
| 1883..... | 860 | 17,787 | 1902..... | 391 | 8,073 |
| 1884..... | 422 | 8,720 | 1903..... | 180 | 3,712 |
| 1885..... | 103 | 2,120 | 1904..... | 140 | 2,900 |
| 1886..... | 193 | 3,981 | 1905..... | 191 | 3,940 |
| 1887..... | 78* | 1,604 | 1906..... | 165 | 3,412 |
| 1888..... | 181 | 3,740 | 1907..... | Nil. | Nil. |
| 1889..... | 58 | 1,207 | 1908..... | Nil. | Nil. |
| 1890..... | 65 | 1,350 | 1909..... | 193 | 3,990 |
| 1891..... | 87 | 1,800 | 1910..... | 124 | 2,565 |
| 1892..... | 628 | 12,987 | 1911..... | 613 | 12,672 |
| 1893..... | 759 | 15,696 | 1912..... | 642 | 13,270 |
| 1894..... | 1,412 | 29,196 | 1913..... | 701 | 14,491 |
| 1895..... | 62 | 1,281 | 1914..... | 1,292 | 26,708 |
| | | | Total..... | 18,191 | 376,001 |

*Calculated from the value: one dollar = 0.048375 oz.

Ontario.

The gold production in Ontario which in 1913 had exceeded the total of all the other years since 1886, showed a further increase in 1914 of about one million dollars, amounting to 268,264 fine ounces valued at \$5,545,509.

The Porcupine district was the main producer. Other producing districts being Kirkland Lake, Larder Lake, and Long Lake.

Statistics of the production of gold in Ontario since 1887 are shown in the following table:—

Ontario:—Annual Production of Gold.

| Calendar Year. | Ozs. (fine*). | Value. | Calendar Year. | Ozs. (fine*). | Value. |
|----------------|---------------|---------|----------------|---------------|------------|
| | | \$ | | | \$ |
| 1887..... | 327 | 6,760 | 1901..... | 11,844 | 244,837 |
| 1888..... | Nil. | Nil. | 1902..... | 11,118 | 229,828 |
| 1889..... | Nil. | Nil. | 1903..... | 9,096 | 188,036 |
| 1890..... | Nil. | Nil. | 1904..... | 1,935 | 40,000 |
| 1891..... | 97 | 2,000 | 1905..... | 4,402 | 91,000 |
| 1892..... | 344 | 7,118 | 1906..... | 3,202 | 66,193 |
| 1893..... | 708 | 14,637 | 1907..... | 3,212 | 66,399 |
| 1894..... | 1,917 | 39,624 | 1908..... | 3,212 | 66,389 |
| 1895..... | 3,015 | 62,320 | 1909..... | 1,569 | 32,425 |
| 1896..... | 5,563 | 115,000 | 1910..... | 3,089 | 63,849 |
| 1897..... | 9,157 | 189,294 | 1911..... | 2,062 | 42,625 |
| 1898..... | 12,863 | 265,889 | 1912..... | 86,523 | 1,788,596 |
| 1899..... | 20,394 | 421,591 | 1913..... | 219,801 | 4,543,690 |
| 1900..... | 14,391 | 297,495 | 1914..... | 268,264 | 5,545,509 |
| | | | Total..... | 698,105 | 14,431,104 |

*Calculated from the value: one dollar=0.048375 oz.

It may be noted from the table "Production of Gold by Provinces" that Ontario from third rank, has become the largest producer of gold in Canada.

The remarkable increase of these last three years was brought about by the successful development of the Porcupine district and recently by the extension of milling facilities in that camp.

The following extracts from the "Report of the Timiskaming and Northern Ontario Railway Commission," gives an idea of the development going on in Northern Ontario:—

Porcupine Gold Production 1914.

| Mines and Mills. | Tonnage milled. | Bullion. | Value. |
|----------------------|-----------------|------------|--------------|
| | | Ozs. | \$ |
| Acme..... | 2,910 | 1,500.00 | 31,000.00 |
| Dome..... | 221,390 | 51,016.12 | 1,054,503.24 |
| Dome Lake..... | 1,638 | 556.00 | 8,832.32 |
| Hollinger..... | 208,936 | 134,000.00 | 2,688,354.80 |
| Porcupine Crown..... | 40,857 | 57,213.00 | 671,177.06 |
| Porcupine Pet..... | 1,433 | 580.40 | 8,264.00 |
| Rea..... | 11,607 | 6,444.00 | 125,000.00 |
| McIntyre..... | 62,209 | 27,500.00 | 549,583.00 |
| Vipond..... | 9,559 | 3,217.95 | 66,514.58 |
| Total..... | 560,539 | 282,327.47 | 5,203,229.00 |

Porcupine Gold Production 1910—1914.

| Year. | Ore treated. | Gold bullion. | Value. |
|------------|--------------|---------------|------------|
| | Tons. | Ounces. | \$ |
| 1910..... | 1,060 | 1,947 | 35,539 |
| 1911..... | 707 | 851 | 17,187 |
| 1912..... | | 83,726 | 1,730,628 |
| 1913..... | | 207,583 | 4,284,928 |
| 1914..... | 560,539 | 282,327 | 5,203,229 |
| Total..... | 562,296 | 576,434 | 11,271,511 |

Cyanide:—"It was feared that those mines using cyanide might have to curtail their output, because much of the world's production of cyanide was of German manufacture, the buying of which is now contrary to the laws of Canada. As a matter of fact it was found on inquiry that all the mines of this district with two exceptions, were using cyanide manufactured in Great Britain by the Cassel Cyanide Co., Ltd., of Glasgow, Scotland.

"Owing to increased cost of raw materials, due directly or indirectly to the war, the price of cyanide has risen to 18 cents per pound, which is a rise of three cents above the price immediately before the war. The offer that the Cassel Cyanide Company is now making to the mines is to keep them supplied with cyanide on the following terms: 18 cents per pound to June 1915; 16 cents per pound to the end of 1916; and 15 cents, or the normal price during 1917 providing that the mines on their part will give the Company an exclusive cyanide contract for two years, giving an estimate now of what their requirements are likely to be during that time.

"The mining companies now using cyanide in the district are:—Cobalt—Buffalo, Dominion Reduction, Nipissing, and O'Brien. Porcupine—Dome, Hollinger, McIntyre, Porcupine Crown, Vipond.

"The normal monthly consumption of cyanide in the district is about 50 tons in Cobalt and 20 tons in Porcupine. This may be expected to gradually increase till the consumption a year from now should run over 100 per month, i.e., nearly half the 1913 consumption of the United States."

Zinc Dust:—"Since the outbreak of war the zinc dust situation has also been creating some uneasiness. Before August last, the main supplies came from Belgium and Silesia, but these being cut off, the mines now have to look to the United States.

"The Belgian price was $6\frac{3}{4}$ cents, but now the price is 11 cents f.o.b. Cobalt. The method of preparation adopted in the United States is different from that of the Belgian furnaces, the American product carrying a slightly higher percentage of oxide and more lead, and therefore having a proportionately smaller precipitating power."

Pebbles:—"The supply of pebbles for pebble mills, formerly came from Denmark and France. Shipments from these points are now practically cut off, but an adequate supply can be obtained from Newfoundland and Sweden. The European pebbles are flint, but those from Newfoundland are a greywacke.

"At the close of 1914 the price per ton of pebbles was \$21.17 at Cobalt and \$21.69 at Porcupine—practically the same price as before the war.

"The annual consumption of pebbles is about 600 tons for Cobalt and 1400 tons for Porcupine."

The mills now using pebbles in this district are:—

Cobalt: Beaver, Buffalo, Cobalt Lake, Dominion Reduction, McKinley-Darragh, Nipissing, O'Brien, and Penn-Canadian. Kirkland Lake: Tough Oakes. Larder Lake: Huronia. Porcupine: Dome, Dome Lake, Hollinger, McIntyre, Porcupine Crown, and Vipond.

The principal producers during 1914 were:—

| Operator. | Mine. | District. |
|---|------------------------|--------------|
| Canadian Exploration Co. | Long Lake. | Algoma. |
| The Dome Mines Co., Ltd. | Dome. | Timiskaming. |
| The Dome Lake Mines, Ltd. | Dome Lake. | " |
| Hollinger Gold Mines, Ltd. | Hollinger. | " |
| Acme Gold Mines. | Acme. | " |
| Porcupine Vipond Mines Co., Ltd. | Porcupine Vipond. | " |
| The McIntyre Porcupine Mines, Ltd. | McIntyre. | " |
| The Porcupine Crown Mines, Ltd. | Porcupine Crown. | " |
| Wm. C. Offer, et al. | Porphyry Hill. | " |
| Mines Leasing and Dev. Co. | Rea. | " |
| Tough Oakes Gold Mines. | Tough Oakes. | " |
| La Mine d'Or Huronia, Ltd. | Huronia. | " |

The following notes are taken from the respective company's reports:—

The Dome Mines Co., Ltd.

Year ending March 31, 1914.

"Record of production for twelve months ending March 31, 1915.

| | |
|---|----------------|
| Tons of ore milled. | 248,550 |
| Total value of ore treated. | \$1,163,954.80 |
| Average value per ton. | \$ 4.68 |
| Bullion recovered by amalgamation. | \$ 671,054.44 |
| Bullion recovered by cyanidation. | \$ 384,442.34 |
| Per cent of value recovered by amalgamation. | 57.60 |
| Per cent of value recovered by cyanidation. | 33.00 |
| Total value recovered. | \$1,055,496.78 |
| Per cent of value recovered. | 90.60 |
| Per cent of possible running time. | 93.70 |

The Company is expecting that the mill's highest crushing capacity—about 28,000 tons per month—will be reached by July, 1915.

The Dome is essentially a low-grade proposition.

Hollinger Gold Mines, Limited.

Year ending December 31, 1914.

| | Hollinger. | Acme. | Total. |
|---|----------------|-------------|----------------|
| Tons of ore milled..... | 208,936 | 2,910 | 211,846 |
| Average value per ton..... | \$ 13,676 | \$11,176 | |
| Total values sent to mill..... | \$2,857,397.54 | \$32,521.93 | \$2,889,919.47 |
| Average tons per day..... | | | 583.59 |
| Per cent of possible running time..... | | | 92.2 |
| Average tons per 24 hours of running time..... | | | 632.97 |
| Stamp duty tons per 24 hours of running time..... | | | 13.30 |

"Unrecovered values:—

| | |
|---|-------------|
| Concentrates stored for re-treatment..... | \$53,686.00 |
| Lost in filter tails..... | 116,879.00 |

| | |
|---|----------------|
| Total..... | \$170,565.00 |
| Values recovered..... | \$2,719,354.47 |
| Value per ton in tailings..... | \$ 0.56 |
| Cyanide consumed per ton of ore..... | 0.525 lbs. |
| Lime " " " "..... | 1.557 " |
| Zinc " " " "..... | 0.532 " |
| Acid " " " "..... | 0.216 " |
| Lead acetate " " " "..... | 0.0031 " |
| Tons of solution precipitated per ton of ore..... | 2.315 |
| Zinc added per ton of solution..... | 0.230 |
| Average value of pregnant solution..... | \$5.698 |
| Per cent of gold extracted..... | 94.089 |

"The average working cost per ton during 1914 amounted to \$4.42 (exclusive of amounts written off for depreciation), as against \$5.21 in 1913. Further reductions will follow, and it is hoped that by the end of 1915 the working cost will be found not to exceed \$4.00 per ton.

"The estimated ore reserves are 1,162,960 tons, with a gross value of \$13,358,420, or a value per ton of \$11.49."

Porcupine Crown Mines, Limited.

Year ending December 31, 1914.

| | |
|---------------------------------|--------------|
| "Tons of ore milled..... | 40,857 |
| Average value of heads..... | \$17.18 |
| " " " tails..... | 0.47 |
| " extraction..... | 97.26% |
| Cost per ton of ore milled..... | \$7.09 |
| Gross value of production..... | \$691,394.29 |
| Mint charges..... | 2,242.83 |
| Mine operation expense..... | 339,196.99 |
| " " net profit..... | 349,954.47 |
| Dividends paid in 1914..... | 240,000.00 |

"The development of the property during the past year has been most satisfactory. The operating costs during the year were appreciably reduced, and by the increase in tonnage can be still further reduced. The ore reserves are valued at $1\frac{1}{2}$ million dollars and amount to 85,000 tons."

McIntyre Porcupine Mines.

Year ending December 31, 1914.

| | |
|--|--------------|
| "Tons of ore milled..... | 62,209 |
| Average value..... | \$9.262 |
| Extraction per ton..... | 8.828 |
| Tailing loss " "..... | 0.434 |
| Gross value..... | \$576,217.60 |
| Bullion produced and by-products obtained..... | \$549,255.42 |
| Total loss in tails..... | \$ 26,962.18 |
| Extraction..... | 95.3% |
| Cost per ton of ore milled..... | \$6.406 |

"The estimated ore reserves, as of March 31, 1915, were 109,693 tons valued at \$854,436."

Manitoba.

There was no production in Manitoba during 1914, but development work was reported from Star Lake, near the eastern boundary of the Province, and from Rice Lake, east of Lake Winnipeg.

Saskatchewan.

In the autumn of 1913 considerable interest was created in the reported gold discoveries at Beaver Lake. A number of prospectors went in with the opening of navigation. A good deal of prospecting was done during 1914, but no shipments have been reported.

The Consolidated Gold Mines (Beaver Lake) Limited, with the Beaver Lake Mining Co., are the two principal operators in the Beaver Lake district. There is talk of the latter Company erecting a 10-stamp mill which would serve as an aid to the general development of the district.

Alberta.

In past years there has been a small production of gold from the gravels of the Saskatchewan river. A very small recovery was reported for 1914 amounting to 48 ounces valued at \$992.

Statistics of the production from the abovementioned source since 1887, are shown in the table following:—

Alberta:—Annual Production of Gold.

| Calendar Year. | Ozs. (fine*). | Value. | Calendar Year. | Ozs. (fine*). | Value. |
|----------------|---------------|--------|----------------|---------------|---------|
| | | \$ | | | \$ |
| 1887..... | 102 | 2,100 | 1901..... | 726 | 15,000 |
| 1888..... | 58 | 1,200 | 1902..... | 484 | 10,000 |
| 1889..... | 967 | 20,000 | 1903..... | 48 | 1,000 |
| 1890..... | 193 | 4,000 | 1904..... | 24 | 500 |
| 1891..... | 266 | 5,500 | 1905..... | 121 | 2,500 |
| 1892..... | 508 | 10,506 | 1906..... | 39 | 800 |
| 1893..... | 466 | 9,640 | 1907..... | 33 | 675 |
| 1894..... | 726 | 15,000 | 1908..... | 50 | 1,037 |
| 1895..... | 2,419 | 50,000 | 1909..... | 25 | 525 |
| 1896..... | 2,661 | 55,000 | 1910..... | 89 | 1,850 |
| 1897..... | 2,419 | 50,000 | 1911..... | 10 | 207 |
| 1898..... | 1,209 | 25,000 | 1912..... | 73 | 1,509 |
| 1899..... | 726 | 15,000 | 1913..... | | |
| 1900..... | 242 | 5,000 | 1914..... | 48 | 992 |
| | | | Total..... | 14,732 | 304,541 |

*Calculated from the value: one dollar=0.048375 oz.

British Columbia.

The gold production of British Columbia in 1914, amounted to \$5,224,393, comprising: placer gold \$565,000; bullion from milling ores \$549,437, and smelter recoveries \$4,109,956.

The statistics for lode gold represent, as closely as can be ascertained, the actual gold recovery based on smelter recoveries and bullion shipments.

There was an increase of 10 per cent in the placer production over that of 1913; a decrease of about 16 per cent in the bullion from milling ores, and a decrease of over 17 per cent in smelter recoveries.

This reduction in production is due to a large extent to the heavy decrease in the output of the Boundary and Nelson districts brought on by the European war, but was made up to some extent by a considerable increase in the Cassiar district, due to the commencement of smelter operations by the Granby Company at Anyox, and by an increase in output from the Trail Creek division.

Of the 1914 production, 10.7 per cent was from alluvial workings; 10.5 per cent from mill bullion, and the balance or 78.8 per cent from smelter recoveries.

Statistics of the production by districts in 1914, as published by the British Columbia Bureau of Mines, and the total annual production since 1858 are given in the following tables:—

British Columbia:—Annual Production of Gold.

| Calendar Year. | Ozs. (fine†). | Value. | Calendar Year. | Ozs. (fine†). | Value. |
|----------------|---------------|-----------|----------------|---------------|-------------|
| | | \$ | | | \$ |
| 1858..... | 34,104 | 705,000 | 1887..... | 33,558 | 693,709 |
| 1859..... | 78,129 | 1,615,072 | 1888..... | 29,834 | 616,731 |
| 1860..... | 107,806 | 2,228,543 | 1889..... | 28,489 | 588,923 |
| 1861..... | 128,973 | 2,666,118 | 1890..... | 23,918 | 494,436 |
| 1862..... | 128,528 | 2,656,903 | 1891..... | 20,792 | 429,811 |
| 1863..... | 189,318 | 3,913,563 | 1892..... | 19,327 | 399,525 |
| 1864..... | 180,722 | 3,735,850 | 1893..... | 18,360 | 379,535 |
| 1865..... | 168,887 | 3,491,205 | 1894..... | 25,664 | 530,530 |
| 1866..... | 128,779 | 2,662,106 | 1895..... | 61,289 | 1,266,954 |
| 1867..... | 120,012 | 2,480,868 | 1896..... | 86,504 | 1,788,206 |
| 1868..... | 114,792 | 2,372,972 | 1897..... | 131,805 | 2,724,657 |
| 1869..... | 85,865 | 1,774,978 | 1898..... | 142,215 | 2,939,852 |
| 1870..... | 64,675 | 1,336,956 | 1899..... | 203,295 | 4,202,473 |
| 1871..... | 87,048 | 1,799,440 | 1900..... | 228,916 | 4,732,105 |
| 1872..... | 77,931 | 1,610,972 | 1901..... | 257,292 | 5,318,703 |
| 1873..... | 63,166 | 1,305,749 | 1902..... | 288,383 | 5,961,409 |
| 1874..... | 89,233 | 1,844,618 | 1903..... | 284,108 | 5,873,036 |
| 1875..... | 119,724 | 2,474,904 | 1904..... | 275,975 | 5,704,908 |
| 1876..... | 86,429 | 1,786,648 | 1905..... | 285,529 | 5,902,402 |
| 1877..... | 77,796 | 1,608,182 | 1906..... | 269,886 | 5,579,039 |
| 1878..... | 61,688 | 1,275,204 | 1907..... | 236,216 | 4,883,020 |
| 1879..... | 62,407 | 1,290,058 | 1908..... | 286,858 | 5,929,880 |
| 1880..... | 49,044 | 1,013,827 | 1909..... | 250,320 | 5,174,579 |
| 1881..... | 50,636 | 1,046,737 | 1910..... | 261,386 | 5,403,318 |
| 1882..... | 46,154 | 954,085 | 1911..... | 238,496 | 4,930,145 |
| 1883..... | 38,422 | 794,252 | 1912..... | 251,815 | 5,205,485 |
| 1884..... | 35,612 | 736,165 | 1913..... | 297,459 | 6,149,027 |
| 1885..... | 34,527 | 713,738 | 1914..... | 252,730 | 5,224,393 |
| 1886..... | 43,714 | 903,651 | | | |
| | | | Total..... | 7,344,540 | 151,825,155 |

†Calculated from the value: one dollar = 0.048375 oz.

British Columbia:—Production of Gold by Districts, 1914.*

| Districts. | GOLD PLACER. | | GOLD LODE. | |
|---|--------------|---------|------------|-----------|
| | Ozs. | Value. | Ozs. | Value. |
| | | \$ | | \$ |
| Cariboo:— | | | | |
| Cariboo..... | 8,250 | 165,000 | | |
| Quesnel..... | 1,750 | 35,000 | | |
| Omineca..... | 300 | 6,000 | 203 | 4,196 |
| Cassiar:— | | | | |
| Atlin..... | 16,100 | 322,000 | 1,000 | 20,670 |
| All others..... | 1,150 | 23,000 | 2,884 | 59,612 |
| East Kootenay:— | | | | |
| Fort Steele..... | 50 | 1,000 | | |
| West Kootenay:— | | | | |
| Ainsworth..... | | | 100 | 2,067 |
| Nelson..... | | | 15,298 | 316,210 |
| Slocan..... | | | 13 | 269 |
| Trail creek..... | | | 138,568 | 2,864,201 |
| Others..... | 100 | 2,000 | 8 | 165 |
| Lillooet..... | 150 | 3,000 | 231 | 4,775 |
| Yale:— | | | | |
| Grand Forks, Greenwood and Osoyoos..... | 50 | 1,000 | 84,908 | 1,775,048 |
| Similkameen, Nicola, and Vernon..... | 150 | 3,000 | 35 | 724 |
| Yale, Ashcroft and Kamloops..... | 150 | 3,000 | 14 | 289 |
| Coast..... | 50 | 1,000 | 3,908 | 80,778 |
| | 28,250 | 565,000 | 247,170 | 5,109,004 |

*From Annual Report of the Minister of Mines for British Columbia.

Yukon.

The production of the Yukon in 1914 was \$5,125,374, as compared with \$5,846,780 in 1913, a decrease of \$721,406, or 12·3 per cent. In this is included the production from the lode mines.

The statistics of production of gold in the Yukon district during the years between 1898 and 1906, as given in the table showing the annual production, are based primarily on the receipts of gold at the United States mints and receiving offices credited to the Canadian Yukon. Although a royalty was exacted on the gold output, it seems certain that considerable amounts of gold were produced which escaped royalty payment especially during the years of high production.

Since 1906 the statistics of gold production of the Yukon have been based on the royalty of 2½ per cent which is collected by the Interior Department. For the purpose of collecting the royalty, a fixed value of \$15 per ounce is placed on the crude gold. The actual value of the deposits for a number of years, has been about \$16·50 per ounce. At the Dominion Government assay office at Vancouver, B.C., there were deposited during the twelve months ending December 31, 1914, 56,564·83 ounces from the Yukon, valued, after all charges had been deducted, at \$916,914·44, showing an average of \$16·21 per ounce.

The production of crude placer gold in the Yukon during the past six years, as ascertained by the Interior Department, and upon which a royalty of 2½ per cent has been collected, is shown in the accompanying table:—

Production of Crude Gold in the Yukon District.

| Month. | 1909. | 1910. | 1911. | 1912. | 1913. | 1914. |
|----------------|------------|------------|------------|------------|------------|------------|
| | Ozs. | Ozs. | Ozs. | Ozs. | Ozs. | Ozs. |
| January..... | 69·50 | 16·68 | ..... | 5·25 | 19·30 | 136·50 |
| February..... | 115·33 | 749·28 | 435·66 | 525·29 | 56·90 | 325·50 |
| March..... | 848·39 | 193·81 | 13·30 | 0·50 | ..... | 6·75 |
| April..... | 3·75 | 0·50 | ..... | ..... | 1,293·69 | 1,572·65 |
| May..... | 117·33 | 43·83 | 16,719·16 | 26,158·66 | 5,557·35 | 11,668·10 |
| June..... | 62,254·92 | 54,301·17 | 38,499·39 | 54,243·03 | 67,594·39 | 67,604·85 |
| July..... | 52,126·43 | 37,942·31 | 42,783·38 | 58,283·29 | 57,873·50 | 45,067·31 |
| August..... | 47,440·83 | 47,673·06 | 47,677·49 | 56,975·55 | 63,315·92 | 49,458·17 |
| September..... | 44,466·20 | 57,695·65 | 48,383·63 | 53,225·29 | 58,641·62 | 62,744·69 |
| October..... | 26,572·23 | 51,888·18 | 58,690·82 | 66,518·01 | 66,798·37 | 63,365·22 |
| November..... | 4,858·69 | 21,404·29 | 11,097·51 | 11,648·08 | 26,565·50 | 4,308·00 |
| December..... | 892·75 | 3,563·75 | 13,130·63 | 7,432·72 | 5,183·50 | 3,433·43 |
| | 239,766·35 | 275,472·51 | 277,430·97 | 335,015·67 | 352,900·04 | 309,691·17 |

The placer production of the Yukon in 1914 is estimated at 247,753 fine ounces of gold valued at \$5,121,509, and 55,744 fine ounces of silver, valued at \$30,554, making the total valuation of the Yukon placer output \$5,153,063. The placer production in 1913 was estimated at 282,320 fine ounces of gold valued at \$5,836,072 and 63,522 fine ounces of silver valued at \$37,980 or a total valuation of \$5,874,052.

A small amount of gold was derived from lode mining.

The Mines Branch has published in 1914 a report on lode mining in the Yukon,¹ being an investigation of the quartz deposits in the Klondike division.

Statistics of the annual production of gold in Yukon since 1885, are shown in the following table:—

Annual Production of Gold in Yukon.

| Calendar Year. | Ozs. (fine‡). | Value. | Calendar Year. | Ozs. (fine‡). | Value. |
|----------------|---------------|------------|----------------|---------------|-------------|
| | | \$ | | | \$ |
| 1885)..... | 4,837 | 100,000 | 1900..... | 1,077,553 | 22,275,000 |
| 1886)..... | | | 1901..... | 870,750 | 18,000,000 |
| 1887..... | 3,386 | 70,000 | 1902..... | 701,437 | 14,500,000 |
| 1888..... | 1,935 | 40,000 | 1903..... | 592,594 | 12,250,000 |
| 1889..... | 8,466 | 175,000 | 1904..... | 507,938 | 10,500,000 |
| 1890..... | 8,466 | 175,000 | 1905..... | 381,001 | 7,876,000 |
| 1891..... | 1,935 | 40,000 | 1906..... | 270,900 | 5,600,000 |
| 1892..... | 4,233 | 87,500 | 1907..... | 152,381 | 3,150,000 |
| 1893..... | 8,514 | 176,000 | 1908..... | 174,150 | 3,600,000 |
| 1894..... | 6,047 | 125,000 | 1909..... | 191,565 | 3,960,000 |
| 1895..... | 12,094 | 250,000 | 1910*..... | 221,091 | 4,570,362 |
| 1896..... | 14,513 | 300,000 | 1911*..... | 224,197 | 4,634,574 |
| 1897..... | 120,937 | 2,500,000 | 1912*..... | 268,447 | 5,549,296 |
| 1898..... | 483,750 | 10,000,000 | 1913*..... | 282,838 | 5,846,780 |
| 1899..... | 774,000 | 16,000,000 | 1914*..... | 247,940 | 5,125,374 |
| | | | | 7,617,895 | 157,475,886 |

‡Calculated from the value; one dollar=0.048375 oz.

*Including a small production from lode mines.

Since 1898 a royalty to the extent of \$4,248,459.47 has been collected on the gold production of this district. The yearly amounts collected, as well as the annual production of gold as ascertained by the Interior Department, are shown in the accompanying table. The difference between these figures and those shown in the table of annual production of the district which are based on mint receipts of Yukon gold, has already been mentioned, and is probably due to three factors: (1) the fixing of the value of the gold for royalty purposes at \$15 per ounce, a figure probably slightly less than the actual value of the gold, (2) the probability that in the earlier years of royalty collection, considerable quantities of gold dust left the camps unrecorded and escaped royalty payments, and (3) the fact that in the last few years there has been a small but growing production from the lode mines.

¹Mines Branch No. 222. "Lode Mining in Yukon." Report by T. C. MacLean, M.E.

Gold Production in the Yukon, and Royalty Collected.†

| Fiscal Year. | Total gold production. | Total exemption. | Royalty collected on. | Royalty paid. |
|----------------------|---------------------------|---------------------|--------------------------|------------------|
| | \$ | \$ | \$ | \$ cts. |
| 1898..... | 3,072,773 | 339,845 | 2,732,928 | 273,292.82 |
| 1899..... | 7,582,283 | 1,699,657 | 5,882,626 | 588,262.37 |
| 1900..... | 9,809,464 | 2,501,744 | 7,307,720 | 730,771.99 |
| 1901..... | 9,162,082 | 1,927,666 | 7,236,522 | 592,660.98 |
| 1902..... | 9,566,340 | 1,199,114 | 8,367,225 | 331,436.79 |
| 1903..... | 12,113,015 | ..... | 12,113,015 | 302,893.48 |
| 1904..... | 10,790,663 | ..... | 10,790,663 | 272,217.96 |
| 1905..... | 8,222,054 | ..... | 8,222,054 | 206,760.87 |
| 1906..... | 6,540,007 | ..... | 6,540,007 | 163,963.25 |
| 1907 (9 months)..... | 3,304,791 | ..... | 3,304,791 | 82,622.42 |
| 1908..... | 2,820,162 | ..... | 2,820,162 | 70,505.65 |
| 1909..... | 3,260,282 | ..... | 3,260,282 | 81,507.07 |
| 1910..... | 3,594,251 | ..... | 3,594,251 | 89,844.10 |
| 1911..... | 4,126,728 | ..... | 4,126,728 | 103,168.19 |
| 1912..... | 4,024,237 | ..... | 4,024,237 | 100,606.29 |
| 1913..... | 5,018,412 | ..... | 5,018,412 | 125,460.52 |
| 1914..... | 5,299,389 | ..... | 5,299,389 | 132,484.72 |

†From the Report of the Yukon and Mining Lands Branch of the Department of the Interior.

IRON AND STEEL.

INTRODUCTORY.

The iron and steel industry in Canada in 1914 was marked by a general decrease in production, which, with a large falling off in imports, showed a greatly diminished consumption.

The quantities of iron and steel annually used is a fair measure of the nation's constructional activity, and Canada had already been experiencing a period of reaction when the war in August caused an almost immediate collapse in an already declining industry. Before the close of the year, however, the demand for steel for munitions and war supplies enabled many of the steel companies to resume operations on a large scale.

Summary of Iron and Steel Statistics, 1911-14.

| | 1911. | 1912. | 1913. | 1914. |
|--|---------------|---------------|---------------|-------------|
| | Tons. | Tons. | Tons. | Tons. |
| Iron ore shipped..... | 210,344 | 215,883 | 307,634 | 244,854 |
| Canadian iron ore charged to blast furnaces..... | 67,434 | 71,588 | 139,436 | 182,964 |
| Imported iron ore charged to blast furnaces..... | 1,628,368 | 2,019,165 | 2,110,828 | 1,324,326 |
| Iron ore charged to steel furnaces..... | 42,892 | 43,006 | 55,018 | 37,686 |
| Pig-iron made..... | 917,535 | 1,014,587 | 1,128,967 | 783,164 |
| Pig-iron and ferro-alloys, exported..... | 5,870 | 6,976 | 6,326 | 19,063 |
| Pig-iron imported..... | 208,487 | 272,565 | 236,769 | 78,680 |
| Ferro-alloys made..... | 7,507 | 7,834 | 8,075 | 7,524 |
| Ferro-alloys imported..... | 17,226 | 19,810 | 30,355 | 22,147 |
| Pig-iron consumption..... | 1,144,885 | 1,307,820 | 1,397,840 | 872,452 |
| Pig-iron used in steel furnaces..... | 700,679 | 706,895 | 913,722 | 619,030 |
| Steel ingots and castings made..... | 882,396 | 957,681 | 1,168,993 | 828,641 |
| Steel rails made..... | 399,760 | 471,422 | 554,481 | 428,225 |
| Canadian coke used in iron blast furnaces..... | 543,933 | 609,183 | 710,260 | 330,269 |
| Imported coke used in iron blast furnaces..... | 577,388 | 656,815 | 706,888 | 590,902 |
| Iron and steel imported..... | (b) 1,215,936 | (b) 1,369,150 | (c) 1,890,506 | (c) 882,636 |
| Number of completed blast furnaces.....No. | 18 | 19 | 22 | 22 |
| Number of men employed in blast furnaces..... ^a | 1,778 | 1,358 | 1,589 | 1,018 |
| Wages paid in blast furnaces.....\$ | 1,097,354 | 993,941 | 1,149,345 | 693,632 |
| Value of pig-iron produced.....\$ | 12,307,125 | 14,550,999 | 16,540,012 | 10,002,856 |
| Value of iron and steel goods exported. (c).....\$ | 9,907,281 | 10,682,484 | 13,999,149 | 14,391,746 |
| Value of iron and steel goods imported. (d).....\$ | 88,179,152 | 105,614,450 | 145,226,972 | 79,762,262 |

(b) Figures cover the fiscal year ending March 31 and include all iron and steel goods for which weights are given.

(c) Figures cover the calendar year.

(d) Figures cover the fiscal year ending March 31, except for 1913 and 1914 when the calendar year is represented.

The conditions under which the iron industry has been carried on in so far as the general relationship of domestic ore supplies to furnace requirements is concerned, have remained practically the same for a number of years. Canadian furnaces are operated largely on imported ores and fuels, only about 12 per cent of the ore consumption and 36 per cent of the fuel used in 1914 being of domestic origin. The imports of iron and steel goods of all kinds has, during the past ten years, been considerably in excess of the domestic production.

Hitherto the exports of iron and steel which have been small compared with the imports, have consisted chiefly of machinery and manufactured goods. In 1914, however, there was some export of pig-iron and of steel rails. With the falling off in Canadian demand, the steel companies have sought new markets abroad, particularly for rails, while the Nova Scotia plants as a result of the war, have also developed an export trade in billets, wire rods, nails, and wire.

IRON ORE.

The total shipments of iron ore from Canadian mines in 1914 were 244,854 tons valued at \$542,041, as compared with 307,634 tons valued at \$629,843, shipped in 1913. Of the total shipments in 1914, 184,444 tons were sent to blast furnaces in Canada and 60,410 tons to the United States.

The shipments comprised 89,454 tons of hematite; 109,838 tons of roasted siderite, and 45,562 tons of magnetite (including some ores with an admixture of hematite). Shipments in 1913 included 92,386 tons of hematite and roasted siderite; 209,886 tons of magnetite, and 5,362 tons of titaniferous iron ore.

There was no active mining of iron ore in Nova Scotia, New Brunswick, or Quebec, during 1914. One shipment of 4,775 tons was made from the Bathurst mine stock.

In Ontario mining operations were confined to the Moose Mountain mines and the Magpie and Helen mines in the Michipicoten districts.

The Canada Iron Mines, Ltd., shipped from Trenton a small tonnage of concentrates averaging about 56 per cent iron. Neither the mines at Bessemer nor the concentrator at Trenton were operated during the year.

The Moose Mountain mines were operated for the first six months of the year and shipments made both of cobbled ore and briquetted ore. The cobbled ore averaged 54.45 per cent iron and the briquetted ore 63.12 per cent iron.

The Algoma Steel Corporation operated both the Helen and Magpie mines. The hematite shipped from the Helen averaged about 55 per cent, and the siderite from the Magpie, after roasting, about 50 per cent, of iron.

Production of Iron Ore by Provinces, 1912-13-14.

| Provinces. | 1912. | | 1913. | | 1914. | |
|--------------------|---------|---------|---------|---------|---------|---------|
| | Tons. | Value. | Tons. | Value. | Tons. | Value. |
| | | \$ | | \$ | | \$ |
| New Brunswick..... | 71,520 | 127,716 | 86,416 | 153,820 | 4,775 | 10,841 |
| Nova Scotia..... | 30,857 | 168,877 | 20,436 | 21,049 | ..... | ..... |
| Quebec..... | 1,185 | 4,232 | 5,102 | 26,999 | ..... | ..... |
| Ontario..... | 112,321 | 222,490 | 195,680 | 427,975 | 240,079 | 531,200 |
| | 215,883 | 523,315 | 307,634 | 629,843 | 244,854 | 542,041 |

Classified Production of Iron Ore, 1913-14.

| Character of ore. | 1913. | | | 1914. | | |
|-------------------|-------------|---------|----------|-------------|---------|----------|
| | Short tons. | Value. | Per ton. | Short tons. | Value. | Per ton. |
| | | \$ | \$ cts. | | \$ | \$ cts. |
| Magnetite..... | 215,248 | 442,702 | 2 06 | 45,562 | 95,060 | 2 09 |
| Hematite..... | 92,386 | 187,141 | 2 03 | { 89,454 | 171,480 | 1 92 |
| Siderite..... | | | | { 109,838 | 275,501 | 2 51 |
| | 307,634 | 629,843 | 2 04 | 244,854 | 542,041 | 2 21 |

A record of the production by provinces in past years is shown in the accompanying tables. There was a considerable production in Ontario previous to 1886 which is not recorded.

Production of Iron Ore, by Provinces, 1886-1914.

| Calendar Year. | New Brunswick. | Nova Scotia. | Quebec. | Ontario. | British Columbia. | Total. |
|----------------|----------------|--------------|---------|----------|-------------------|---------|
| | Tons. | Tons. | Tons. | Tons. | Tons. | Tons. |
| 1886..... | | 44,388 | | 16,032 | 3,941 | 64,361 |
| 1887..... | | 43,532 | 13,404 | 16,598 | 2,796 | 76,330 |
| 1888..... | | 42,611 | 10,710 | 16,894 | 8,372 | 78,587 |
| 1889..... | | 54,161 | 14,533 | | 15,487 | 84,181 |
| 1890..... | | 49,206 | 22,305 | | | 76,511 |
| 1891..... | | 53,649 | 14,380 | | 950 | 68,979 |
| 1892..... | | 78,258 | 22,690 | | 2,300 | 103,248 |
| 1893..... | | 102,201 | 22,076 | | 1,325 | 125,602 |
| 1894..... | | 89,379 | 19,492 | | 1,120 | 109,991 |
| 1895..... | | 83,792 | 17,783 | | 1,222 | 102,797 |
| 1896..... | | 58,810 | 17,630 | 15,270 | 196 | 91,906 |
| 1897..... | | 23,400 | 22,436 | 2,770 | 2,099 | 50,705 |
| 1898..... | | 19,079 | 17,873 | 21,111 | 280 | 58,343 |
| 1899..... | | 28,000 | 19,420 | 25,126 | 2,071 | 74,617 |
| 1900..... | | 18,940 | 19,000 | 82,950 | | 122,000 |
| 1901..... | | 18,619 | 15,489 | 272,533 | 7,000 | 313,646 |
| 1902..... | | 16,172 | 18,524 | 359,288 | 10,019 | 404,003 |
| 1903..... | | 40,335 | 12,035 | 209,634 | 2,290 | 264,294 |
| 1904..... | | 61,293 | 16,152 | 141,601 | | 219,046 |
| 1905..... | | 84,952 | 12,681 | 193,464 | | 291,097 |
| 1906..... | | 97,820 | 9,933 | 141,078 | | 248,831 |
| 1907..... | | 89,839 | 12,748 | 207,769 | | 312,856 |
| 1908..... | | 11,802 | 10,103 | 216,177 | 2,500 | 238,082 |
| 1909..... | | | 4,150 | 263,893 | | 268,043 |
| 1910..... | 5,336 | 18,134 | 4,503 | 231,445 | | 259,418 |
| 1911..... | 31,120 | 22 | 3,616 | 175,586 | | 210,344 |
| 1912..... | 71,520 | 30,857 | 1,185 | 112,321 | | 215,883 |
| 1913..... | 86,416 | 20,436 | 5,102 | 195,680 | | 307,634 |
| 1914..... | 4,775 | | | 240,079 | | 244,854 |

Production of Iron Ore in Nova Scotia, 1876-1885.

| Calendar Year. | Tons. | Calendar Year. | Tons. |
|----------------|--------|----------------|--------|
| 1876..... | 15,274 | 1881..... | 39,843 |
| 1877..... | 16,879 | 1882..... | 42,135 |
| 1878..... | 36,600 | 1883..... | 52,410 |
| 1879..... | 29,889 | 1884..... | 54,885 |
| 1880..... | 51,193 | 1885..... | 48,129 |

EXPORTS AND IMPORTS OF IRON ORE.

According to returns received direct from the mine operators, 60,410 tons of ore were shipped to the United States during 1914, as against shipments to destinations outside of Canada during 1913 totalling 216,614 tons, and including 196,151 tons shipped to the United States, 12,927 tons to Scotland, and 7,536 tons to Holland.

The imports of iron ore into Canada were not separately shown by the Customs Department until April, 1912. The imports during the twelve months ending December, 1914, were reported as 1,147,108 tons, valued at \$2,387,358, as compared with 1,942,325 tons valued at \$3,877,824 imported in 1913. The imports in 1914 included 749,979 tons valued at \$1,972,550 from the United States; 389,850 tons valued at \$389,850 from Newfoundland, and 7,279 tons valued at \$24,958 from other countries.

There were used in Canadian furnaces in 1914, 1,324,326 tons of imported ores as compared with 2,110,828 tons in 1913. The annual consumption of imported ores in blast furnaces which was formerly the only record of imports, is shown in tabular form and the total quantity of imported ores thus consumed since 1896 has been about 16,000,000 tons.

The imported ores have been obtained chiefly from Newfoundland and the iron ranges south of Lake Superior.

The Newfoundland deposits are operated by the two Canadian companies operating coal mines and steel plants at Sydney and Sydney Mines in Cape Breton.

The total quantity of Newfoundland ores shipped during 1914 from the Wabana Mines, was 639,430 short tons of which 422,920 tons were shipped to Sydney and 216,510 tons to the United States and Europe.

In 1913 the shipments from Wabana, Newfoundland, were 1,605,920 short tons of which 1,048,432 tons were shipped to Sydney and 557,488 tons to the United States and Europe.

According to the "United States Report of Commerce and Navigation" there were exported to Canada during the twelve months ending June 1914, 1,125,090 short tons of iron ore valued at \$3,401,146 and during the previous year 1,367,928 tons valued at \$3,684,233.

Exports of Iron Ore, Calendar Years 1893-1914.

| Calendar Year. | Tons. | Value. | Average. value. | Calendar Year. | Tons. | Value. | Average. value. |
|----------------|---------|-----------|--------------------|----------------|---------|---------|--------------------|
| | | \$ | \$ | | | \$ | \$ |
| 1893..... | 2,419 | 7,590 | 3 14 | 1904*..... | 168,828 | 401,738 | 2 38 |
| 1894..... | | 21,294 | | 1905*..... | 168,289 | 407,881 | 2 42 |
| 1895..... | 1,571 | 3,909 | 2 49 | 1906..... | 74,778 | 149,177 | 2 01 |
| 1896..... | 1,033 | 1,911 | 1 85 | 1907..... | 25,901 | 45,907 | 1 77 |
| 1897..... | 403 | 1,811 | 2 01 | 1908..... | (a) | | |
| 1898..... | 182 | 278 | 1 54 | 1909..... | 21,956 | 61,954 | 2 82 |
| 1899..... | 4,145 | 9,538 | 2 30 | 1910..... | 114,499 | 324,186 | 2 83 |
| 1900..... | 5,527 | 13,511 | 2 44 | 1911..... | 37,686 | 133,411 | 3 54 |
| 1901*..... | 306,199 | 762,283 | 2 49 | 1912..... | 118,129 | 382,005 | 3 23 |
| 1902*..... | 428,901 | 1,065,019 | 2 48 | 1913..... | 126,124 | 426,681 | 3 38 |
| 1903*..... | 368,233 | 922,571 | 2 51 | 1914..... | 135,451 | 360,974 | 2 67 |

*The export figures for the five years indicated are incorrect owing to a duplication of entries.

(a) The figures of the Trade Report for this year include ferro-products, and are, therefore, omitted.

Imports* of Iron Ore into the United States from Canada, 1893-1914.

| Year ending June 30. | Short tons. | Value. | Average value. | Year ending June 30. | Short tons. | Value. | Average value. |
|-------------------------|----------------|---------|-------------------|-------------------------|----------------|---------|-------------------|
| | | \$ | \$ cts. | | | \$ | \$ cts. |
| 1893..... | 7,706 | 17,186 | 2 23 | 1904..... | 126,995 | 283,765 | 2 23 |
| 1894..... | 301 | 756 | 2 51 | 1905..... | 120,241 | 245,623 | 2 04 |
| 1895..... | 2,681 | 10,114 | 3 77 | 1906..... | 113,809 | 220,112 | 1 93 |
| 1896..... | 39 | 142 | 3 64 | 1907..... | 34,731 | 52,765 | 1 52 |
| 1897..... | 2,535 | 5,243 | 2 07 | 1908..... | 32,124 | 55,617 | 1 73 |
| 1898..... | 1,313 | 2,904 | 2 21 | 1909..... | 3,490 | 12,660 | 3 63 |
| 1899..... | 2,585 | 5,120 | 1 98 | 1910..... | 36,070 | 97,984 | 2 72 |
| 1900..... | 4,477 | 5,550 | 1 24 | 1911..... | 117,393 | 264,452 | 2 25 |
| 1901..... | 34,453 | 76,159 | 2 21 | 1912..... | 45,089 | 89,336 | 1 98 |
| 1902..... | 309,527 | 685,540 | 2 21 | 1913..... | 159,146 | 282,434 | 1 77 |
| 1903..... | 144,725 | 320,263 | 2 21 | 1914..... | 168,203 | 360,484 | 2 14 |

*Compiled from the "Foreign Commerce and Navigation of the United States."

Exports of Iron Ore from the United States to Canada.

| Year ending June 30. | Tons of 2000 lbs. | Value. | Average value. | Year ending June 30. | Tons of 2000 lbs. | Value. | Average value. |
|-------------------------|----------------------|---------|-------------------|-------------------------|----------------------|-----------|-------------------|
| | | \$ | \$ cts. | | | \$ | \$ cts. |
| 1896..... | 1,270 | 4,042 | 3 18 | 1906..... | 254,399 | 608,029 | 2 39 |
| 1897..... | 10,942 | 34,168 | 3 12 | 1907..... | 266,103 | 670,995 | 2 52 |
| 1898..... | 12,921 | 34,224 | 2 65 | 1908..... | 327,918 | 880,197 | 2 68 |
| 1899..... | 33,598 | 60,497 | 1 80 | 1909..... | 449,755 | 1,264,048 | 2 81 |
| 1900..... | 45,237 | 78,542 | 1 74 | 1910..... | 609,617 | 1,636,917 | 2 69 |
| 1901..... | 67,994 | 175,689 | 2 58 | 1911..... | 826,071 | 2,496,246 | 3 02 |
| 1902..... | 76,457 | 178,107 | 2 45 | 1912..... | 931,647 | 2,806,238 | 3 01 |
| 1903..... | 86,258 | 264,755 | 3 07 | 1913..... | 1,367,928 | 3,684,233 | 2 69 |
| 1904..... | 92,577 | 252,254 | 2 72 | 1914..... | 1,125,090 | 3,401,146 | 3 02 |
| 1905..... | 264,214 | 529,454 | 2 00 | | | | |

Annual Shipments of Iron Ore from Wabana Mines, Newfoundland.

| Calendar year. | To Canada. | To Europe and United States. | Total shipments. |
|----------------|----------------|------------------------------------|---------------------|
| | Short tons. | Short tons. | Short tons. |
| 1909..... | 697,068 | 412,981 | 1,110,049 |
| 1910..... | 808,762 | 450,864 | 1,259,626 |
| 1911..... | 765,184 | 416,279 | 1,181,463 |
| 1912..... | 956,459 | 375,453 | 1,331,912 |
| 1913..... | 1,048,432 | 557,488 | 1,605,920 |
| 1914..... | 422,920 | 216,510 | 639,430 |

PIG-IRON AND STEEL.

The making of iron and steel in Canada, is an industry which has been built up largely on the basis of imported ores. The output has increased very rapidly from 1900 to 1913 but through lack of demand fell off very considerably in 1914.

The total production of pig-iron in 1914, not including the output of ferro-products which is separately tabulated, was 783,164 short tons (699,256 long tons) valued at approximately \$10,002,856, as compared with 1,128,967 short tons (1,008,006 long tons), valued at \$16,540,012 in 1913, and 1,014,587 short tons (905,881 long tons) valued at \$14,550,999 in 1912. A decrease of over 30 per cent is shown in the production of pig-iron in 1914, as compared with an increase of 11.3 per cent in the production of 1913 over that of 1912.

At the close of the year Canada had twenty-two completed furnaces grouped in twelve separate completed plants owned by nine companies or corporations. Of the twenty-two completed furnaces, eleven having an aggregate daily capacity of about 1,540 tons, were idle throughout the past year. The eleven furnaces operated had an aggregate daily capacity of about 2,950 tons. The capacities of the various furnaces are shown on page 97.

Of the total output of pig-iron in 1914, 9,380 tons were made with charcoal as fuel, and 773,784 tons with coke. The amount of charcoal pig-iron made in 1913 was 23,696 tons, and in 1912, 21,701 tons, while the quantity made with coke in 1913 was 1,105,271 tons, and in 1912, 992,886 tons.

The classification of the coke iron production in 1914 according to the purpose for which it was intended was as follows: Bessemer 230,817 tons; basic 346,553 tons; foundry, including miscellaneous 196,414 tons.

The classification of the coke iron production in 1913, was as follows: Bessemer 265,685 tons; basic 614,845 tons; foundry, including miscellaneous, 224,741 tons.

The total production of pig-iron in 1913 and 1914 is shown by provinces in the following table, the average value per ton also being indicated. It should be explained that the value placed upon the pig-iron production in Nova Scotia is an assumed or estimated value. A large proportion of the pig-iron made in this Province is directly converted into steel, and as a very small portion only of the metal is sold as pig-iron it is difficult to obtain a satisfactory valuation for the output. It must not be inferred, therefore, that these values represent sales values.

There has been no production of pig-iron in the Province of Quebec during the past three years. In former years this Province has had a continuous though small production of charcoal iron which commanded a high price.

Production of Pig-Iron by Provinces, 1913-14.

| Provinces. | 1913. | | | 1914. | | | Percentage increase or decrease in quantity. |
|------------------|-----------|------------|----------------|---------|------------|----------------|--|
| | Tons. | Value. | Value per ton. | Tons. | Value. | Value per ton. | |
| | | \$ | \$ cts. | | \$ | \$ cts. | % |
| Nova Scotia..... | 480,068 | 7,201,020 | 15 00 | 227,052 | 2,951,676 | 13 00 | -52.70 |
| Ontario..... | 648,899 | 9,338,992 | 14 39 | 556,112 | 7,051,180 | 12 68 | -14.30 |
| Total..... | 1,128,967 | 16,540,012 | 14 65 | 783,164 | 10,002,856 | 12 77 | -30.63 |

A record of the production by provinces since 1887 is shown in the following table. Formerly Nova Scotia was the largest producer but since 1909, Ontario has had the largest output. The proportions of the total contributed by the two provinces in 1914 were: Nova Scotia 30 per cent and Ontario 70 per cent.

Annual Production of Pig-Iron by Provinces, 1887-1914.

| Year. | NOVA SCOTIA. | | ONTARIO. | | QUEBEC. | | TOTAL. | |
|-----------|--------------|-----------|----------|-----------|---------|---------|-----------|------------|
| | Tons. | Value. | Tons. | Value. | Tons. | Value. | Tons. | Value. |
| | | \$ | | \$ | | \$ | | \$ |
| 1887..... | 19,320 | 250,000 | | | 5,507 | 116,192 | 24,827 | 366,192 |
| 1888..... | 17,556 | 211,403 | | | 4,243 | 101,832 | 21,799 | 313,235 |
| 1889..... | 21,289 | 383,202 | | | 4,632 | 116,670 | 25,921 | 499,872 |
| 1890..... | 18,382 | 262,608 | | | 3,390 | 69,080 | 21,772 | 331,688 |
| 1891..... | 20,840 | 297,728 | | | 3,051 | 71,173 | 23,891 | 368,901 |
| 1892..... | 34,393 | 458,556 | | | 8,050 | 178,865 | 42,443 | 637,421 |
| 1893..... | 46,472 | 553,408 | | | 9,475 | 236,875 | 55,947 | 790,283 |
| 1894..... | 41,344 | 449,533 | | | 8,623 | 196,914 | 49,967 | 646,447 |
| 1895..... | 35,192 | 417,083 | | | 7,262 | 169,653 | 42,454 | 586,736 |
| 1896..... | 32,351 | 400,829 | 28,302 | 368,942 | 6,615 | 154,358 | 67,268 | 924,129 |
| 1897..... | 22,500 | 230,000 | 26,115 | 291,466 | 9,392 | 217,235 | 58,007 | 738,701 |
| 1898..... | 21,627 | 221,677 | 48,253 | 530,789 | 7,135 | 159,929 | 77,015 | 912,395 |
| 1899..... | 31,100 | 404,300 | 64,749 | 808,157 | 7,094 | 164,849 | 102,943 | 1,377,306 |
| 1900..... | 28,133 | 421,995 | 62,387 | 938,725 | 6,055 | 140,978 | 96,575 | 1,501,698 |
| 1901..... | 151,130 | 1,764,017 | 116,371 | 1,599,413 | 6,875 | 149,493 | 274,376 | 3,512,923 |
| 1902..... | 237,244 | 2,477,767 | 112,688 | 1,584,273 | 7,970 | 181,501 | 357,902 | 4,243,541 |
| 1903..... | 201,246 | 2,186,273 | 87,004 | 1,345,464 | 9,635 | 210,973 | 297,885 | 3,742,710 |
| 1904..... | 164,488 | 1,700,130 | 127,845 | 1,746,126 | 11,121 | 241,729 | 303,454 | 3,687,985 |
| 1905..... | 261,014 | 2,440,722 | 256,704 | 3,868,197 | 7,588 | 166,267 | 525,306 | 6,475,186 |
| 1906..... | 315,008 | 3,439,217 | 275,558 | 4,338,275 | 7,845 | 177,644 | 598,411 | 7,955,136 |
| 1907..... | 366,456 | 4,211,913 | 275,459 | 4,581,309 | 10,047 | 232,004 | 651,962 | 9,125,226 |
| 1908..... | 352,642 | 3,554,540 | 271,484 | 4,385,271 | 6,709 | 171,383 | 630,835 | 8,111,194 |
| 1909..... | 345,380 | 3,453,800 | 407,012 | 6,002,441 | 4,770 | 125,623 | 757,162 | 9,581,864 |
| 1910..... | 350,287 | 4,203,444 | 447,273 | 6,956,923 | 3,237 | 85,255 | 800,797 | 11,245,622 |
| 1911..... | 390,242 | 4,682,904 | 526,635 | 7,606,939 | 658 | 17,282 | 917,535 | 12,307,125 |
| 1912..... | 424,994 | 6,374,910 | 589,593 | 8,176,089 | | | 1,014,587 | 14,550,999 |
| 1913..... | 480,068 | 7,201,020 | 648,899 | 9,338,992 | | | 1,128,967 | 16,540,012 |
| 1914..... | 227,052 | 2,951,676 | 556,112 | 7,051,180 | | | 783,164 | 10,002,856 |

A record of the average monthly prices per gross ton of pig-iron at Montreal during 1913 and 1914, as published by the Department of Labour, and of Bessemer pig-iron and grey forge iron at Pittsburgh for a period of ten years, as compiled by trade journals, is shown in the accompanying tables:—

Average Monthly Prices of Pig-Iron in Canada During 1913-14.

(From Report on Wholesale Prices by Department of Labour.)

| | (1) Foundry No. 1, N.S. at Montreal. | | (2) Summerlee No. 2 at Montreal. | |
|----------------|--|-------------|--|--------|
| | 1913. | 1914. | 1913. | 1914. |
| January..... | 22.00 | 19.50-21.00 | 24.00 | 23.00 |
| February..... | 22.00 | 19.50-21.00 | 24.00 | 23.00 |
| March..... | 22.00 | 19.50-21.00 | 24.00 | 23.00 |
| April..... | 22.00 | 19.00-20.50 | 24.00 | 22.50 |
| May..... | 22.00 | 19.00-20.50 | 22.50 | 22.50 |
| June..... | 21.00-22.00 | 19.00-20.00 | 22.50 | 22.50 |
| July..... | 20.00-21.00 | 19.00-20.00 | 22.50 | 22.50 |
| August..... | 20.00-21.00 | 19.00-20.00 | 22.50 | 22.50 |
| September..... | 20.00-21.00 | 19.00-20.00 | 22.50 | 22.50 |
| October..... | 20.00-21.00 | 19.00-20.00 | 22.50 | 22.75 |
| November..... | 19.50-21.00 | 19.00-19.75 | 22.50 | 22.75 |
| December..... | 19.50-21.00 | 19.00-19.75 | 22.50 | 23.00 |
| Average..... | 19.437 | 19.708 | 23.00 | 22.708 |

(1) Price per ton of 2,240 pounds, f.o.b. at Montreal, on the opening market day of each month; quotations supplied by the Dominion Iron and Steel Co., Ltd.

(2) Price per ton at Montreal, in the first week of each month, quotations furnished by Drummond, McCall & Co., Ltd.

Bessemer Pig-Iron at Pittsburgh, per Gross Ton (2,240 pounds)*.

| | 1905. | 1906. | 1907. | 1908. | 1909. | 1910. | 1911. | 1912. | 1913. | 1914. |
|----------------|--------|---------|---------|---------|---------|---------|---------|---------|---------|---------|
| | \$ cts | \$ cts. | \$ cts. | \$ cts. | \$ cts. | \$ cts. | \$ cts. | \$ cts. | \$ cts. | \$ cts. |
| January..... | 16 85 | 18 35 | 23 15 | 19 00 | 17 34 | 19 90 | 15 90 | 15 05 | 18 15 | 14 96 |
| February..... | 16 41 | 18 35 | 22 85 | 17 90 | 16 78 | 19 34 | 15 90 | 14 90 | 18 15 | 15 09 |
| March..... | 16 35 | 18 28 | 22 85 | 17 86 | 16 25 | 18 60 | 15 90 | 15 09 | 18 15 | 15 09 |
| April..... | 16 35 | 18 19 | 23 35 | 17 49 | 15 78 | 18 27 | 15 90 | 15 15 | 17 90 | 14 90 |
| May..... | 16 16 | 18 10 | 24 01 | 16 93 | 15 84 | 17 52 | 15 90 | 15 13 | 17 70 | 14 90 |
| June..... | 16 65 | 18 23 | 24 27 | 16 90 | 16 05 | 16 60 | 15 90 | 15 15 | 17 14 | 14 90 |
| July..... | 14 85 | 18 41 | 23 55 | 16 83 | 16 46 | 16 40 | 15 90 | 15 20 | 16 70 | 14 90 |
| August..... | 15 20 | 19 00 | 22 90 | 16 23 | 17 03 | 16 09 | 15 90 | 15 46 | 16 52 | 14 90 |
| September..... | 15 91 | 19 54 | 22 90 | 15 90 | 18 05 | 15 90 | 15 90 | 16 15 | 16 65 | 14 90 |
| October..... | 16 54 | 20 35 | 22 00 | 15 71 | 19 53 | 15 90 | 15 44 | 17 80 | 16 60 | 14 84 |
| November..... | 17 85 | 22 85 | 20 65 | 16 59 | 19 90 | 15 82 | 15 00 | 18 02 | 16 02 | 14 59 |
| December..... | 18 35 | 23 75 | 19 34 | 17 40 | 19 90 | 15 90 | 15 03 | 18 15 | 15 77 | 14 70 |

* From the *Iron Age*.

Grey Forge Pig-Iron at Pittsburgh, per Gross Ton (2,240 pounds).

| | 1905. | 1906. | 1907. | 1908. | 1909. | 1910. | 1911. | 1912. | 1913. | 1914. |
|----------------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|
| | \$ cts. | \$ cts. | \$ cts. | \$ cts. | \$ cts. | \$ cts. | \$ cts. | \$ cts. | \$ cts. | \$ cts. |
| January..... | 16 11 | 17 30 | 22 58 | 17 00 | 15 40 | 17 40 | 14 09 | 13 40 | 17 15 | 13 65 |
| February..... | 15 99 | 17 29 | 22 20 | 15 99 | 15 09 | 17 02 | 14 27 | 13 40 | 17 15 | 13 65 |
| March..... | 16 00 | 16 91 | 21 76 | 15 90 | 14 65 | 16 15 | 14 40 | 13 40 | 16 92 | 13 65 |
| April..... | 15 77 | 16 66 | 21 72 | 15 45 | 14 40 | 16 09 | 14 40 | 13 65 | 16 17 | 13 65 |
| May..... | 15 57 | 16 49 | 22 88 | 14 90 | 14 40 | 15 90 | 14 27 | 13 78 | 15 17 | 13 65 |
| June..... | 15 18 | 16 35 | 23 15 | 14 90 | 14 77 | 15 20 | 14 00 | 13 90 | 14 71 | 13 65 |
| July..... | 14 55 | 16 41 | 22 96 | 14 90 | 14 85 | 14 52 | 13 90 | 13 90 | 14 55 | 13 65 |
| August..... | 14 36 | 17 75 | 21 90 | 14 71 | 15 21 | 14 30 | 13 90 | 14 15 | 14 25 | 13 65 |
| September..... | 14 72 | 18 35 | 21 15 | 14 46 | 16 15 | 14 15 | 13 84 | 14 65 | 14 25 | 13 65 |
| October..... | 15 66 | 19 47 | 20 40 | 14 40 | 17 02 | 14 15 | 13 65 | 16 18 | 14 26 | 13 58 |
| November..... | 16 58 | 22 45 | 19 17 | 14 90 | 17 27 | 14 09 | 13 47 | 16 50 | 14 25 | 13 45 |
| December..... | 16 97 | 22 85 | 18 40 | 15 25 | 17 40 | 13 90 | 13 40 | 17 15 | 13 95 | 13 40 |

Previous to 1896, pig-iron was made entirely from Canadian ores. Since that date, however, increasing quantities of imported ore have been used, as well as imported fuels and fluxes, and in 1914 about 88 per cent of the ore charged, 64 per cent of the coke, and a large proportion of the limestone, were imported. This condition is attributed largely to questions of cost and transportation affecting the ore supplies available for each furnace. The Newfoundland ores can be cheaply and conveniently laid down at Sydney, N.S.—in fact the iron and steel industry here has been built up on the basis of these ores and by the local coal supply. During the past two years considerable quantities of limestone have also been obtained from Newfoundland. In Ontario also, large quantities of imported ores are used. In 1914 the imported ores used in Ontario amounted to 865,004 tons, and the Canadian ores 182,964 tons, the imported ores being derived from the deposits south of Lake Superior. With the exception of a small quantity of charcoal, the fuel used in Ontario was altogether imported, either as coal or as coke. A portion of the limestone flux was also imported.

Iron Ore, Fuel, and Flux Charged to Blast Furnaces.

| Calendar Year. | IRON ORE CHARGED. | | FUEL CHARGED. | | | Limestone. |
|----------------|-------------------|-----------|---------------|---------------------------|---|------------|
| | Canadian. | Imported. | Charcoal. | *Coke from Canadian coal. | Coke imported or made from imported coal. | |
| | Tons. | Tons. | Bushels. | Tons. | Tons. | Tons. |
| 1887..... | 60,434 | | 940,400 | 33,581 | | 17,171 |
| 1888..... | 54,956 | | 804,286 | 30,228 | | 16,857 |
| 1889..... | 65,670 | | 755,800 | 36,333 | | 22,122 |
| 1890..... | 57,304 | | 589,860 | 34,073 | | 18,478 |
| 1891..... | 60,933 | | 441,812 | 32,796 | | 11,377 |
| 1892..... | 96,948 | | 1,121,365 | 52,622 | | 22,967 |
| 1893..... | 124,053 | | 1,302,720 | 65,332 | | 27,797 |
| 1894..... | 108,871 | | 1,173,970 | 60,026 | | 35,101 |
| 1895..... | 93,208 | | 789,561 | 51,629 | | 31,585 |
| 1896..... | 96,560 | 46,300 | 756,600 | 50,067 | 33,990 | 37,462 |
| 1897..... | 53,658 | 55,722 | 1,031,800 | 35,800 | 27,810 | 31,273 |
| 1898..... | 57,881 | 77,107 | 836,400 | 31,952 | 50,407 | 33,913 |
| 1899..... | 66,384 | 120,650 | 1,928,025 | 44,844 | 64,648 | 51,826 |
| 1900..... | 71,341 | 112,042 | 1,799,737 | 45,021 | 59,345 | 52,966 |
| 1901..... | 156,613 | 361,010 | 1,835,736 | 207,835 | 115,367 | 169,399 |
| 1902..... | 125,664 | 559,381 | 2,146,623 | 362,208 | 112,314 | 293,594 |
| 1903..... | 82,035 | 485,911 | 2,322,030 | 350,190 | 96,540 | 277,452 |
| 1904..... | 180,932 | 454,671 | 3,477,470 | 257,182 | 130,210 | 211,278 |
| 1905..... | 116,974 | 861,847 | 4,404,394 | 365,897 | 243,882 | 369,715 |
| 1906..... | 221,733 | 982,740 | 2,168,476 | 462,672 | 304,676 | 456,036 |
| 1907..... | 244,104 | 1,117,260 | 1,682,085 | 521,068 | 327,082 | 488,462 |
| 1908..... | 209,266 | 1,051,445 | 1,121,990 | 492,076 | 325,670 | 483,065 |
| 1909..... | 231,994 | 1,235,000 | 1,779,258 | 412,016 | 507,255 | 526,076 |
| 1910..... | 149,505 | 1,377,035 | 1,615,919 | 491,281 | 476,838 | 569,355 |
| 1911..... | 67,434 | 1,628,368 | 1,960,459 | 543,933 | 577,388 | 625,216 |
| 1912..... | 71,588 | 2,019,165 | 1,886,748 | 609,183 | 656,815 | 705,613 |
| 1913..... | 139,436 | 2,110,828 | 2,206,191 | 710,260 | 706,888 | 630,119 |
| 1914..... | 182,964 | 1,324,326 | 920,045 | 330,269 | 590,902 | 447,641 |

* Includes for the first ten years small quantity of coal.

IRON BLAST FURNACES IN CANADA IN 1914.

Of twenty-two completed furnaces, eleven were in blast in 1914 for varying periods of time. The total, daily capacity of the 22 furnaces is about 4,490 tons. The operating companies, with numbers and capacities of furnaces, were as follows:—

Dominion Iron & Steel Co., Sydney, C.B.: six completed furnaces of 280 tons capacity each, per day; one operated throughout 1914; one for 225 days, and one for 241 days; three furnaces idle throughout the year.

Nova Scotia Steel & Coal Co., Ltd., New Glasgow, N.S.: one furnace at Sydney Mines, C.B., of 250 tons capacity; operated 128 days.

Londonderry Iron & Mining Co., Ltd. (in liquidation), Londonderry, N.S.: one furnace of 100 tons capacity; idle throughout the year.

Canada Iron Corporation, Ltd. (in liquidation), Montreal, Que.: two small furnaces of seven and eight tons capacity, at Drummondville, Que.; one furnace of 24 tons daily capacity, at Radnor Forges, Que.; two furnaces of 125 tons and 250 tons at Midland, Ont., all idle throughout the year.

Standard Iron Co. of Canada, Ltd., Deseronto, Ont.: one furnace at Deseronto with a daily capacity of 112 tons, operated for 144 days during the year 1914; one furnace of 84 tons capacity at Parry Sound idle throughout the year.

The Steel Co. of Canada, Ltd., Hamilton, Ont.: two furnaces, one of 200 tons capacity, operated for 184 days in 1914, a second furnace of 300 tons capacity, operated 211 days in 1914.

Algoma Steel Co., Ltd., Sault Ste. Marie, Ont.: three furnaces at Steelton, near Sault Ste. Marie, two of 250 tons capacity each, operated for 358 and 365 days respectively; and one of 450 tons capacity, operated 243 days.

The Atikokan Iron Co., Ltd., Port Arthur, Ont.: one furnace of 175 tons capacity, idle throughout the year.

The Canadian Furnace Co. Ltd., Port Colborne, Ont.: one furnace of 300 tons capacity, operated 262 days in 1914.

EXPORTS AND IMPORTS OF PIG-IRON.

The total exports of pig-iron, including ferro-alloys, during 1914 were 19,063 tons valued at \$486,366, or an average value per ton of \$25.51 compared with exports of 6,326 tons valued at \$351,646, or an average of \$55.59 in 1913.

The exports between 1905 and 1913 did not exceed 10,000 tons in any one year, and consisted largely, if not entirely, of ferro-alloys. During 1914, however, there was a small export of pig-iron chiefly from Sydney to Philadelphia. The exports during the first three months of the year were 4,431 tons which probably included about 4,000 tons of pig-iron. From the

first of April the exports were separately classified and during the last nine months of the year included 9,767 tons of pig-iron valued at \$118,111 or an average of \$12.09 per ton and 4,865 tons of ferro-alloys valued at \$285,221 or an average of \$58.63 per ton.

Considerable quantities of pig-iron are annually imported into Canada. During the calendar year 1914 the total imports of pig-iron, excluding ferro-products which are separately stated, were 78,680 tons valued at \$982,189, and included 69,254 tons valued at \$862,598, or an average of \$12.46 per ton, from the United States; and 9,426 tons valued at \$119,591 or an average of \$12.68 per ton, from Great Britain. The total imports in 1913 were 236,769 tons valued at \$3,247,405 or an average of \$13.71 per ton, and in 1912, 272,680 tons valued at \$3,512,969 or an average of \$12.88 per ton. These imports in 1914 included 86 tons of charcoal pig-iron valued at \$1,082, or \$12.58 per ton, as compared with 926 tons of charcoal pig-iron in 1913, valued at \$12,528 or an average of \$13.52 per ton.

The annual imports of these two classes of pig-iron since 1880 are shown herewith.

Annual Exports of Pig-Iron and Ferro-Alloys, 1896-1914.

| Calendar Year. | Tons. | Value. | Average value. | Calendar Year. | Tons. | Value. | Average value. |
|----------------|--------|---------|----------------|----------------|--------|---------|----------------|
| | | \$ | \$ cts. | | | \$ | \$ cts. |
| 1896..... | 2,187 | 55,448 | 25 35 | 1905..... | 866 | 22,284 | 25 73 |
| 1897..... | 3,099 | 81,381 | 26 26 | 1906..... | 305 | 7,429 | 24 36 |
| 1898..... | 1,278 | 32,645 | 25 54 | 1907..... | 439 | 13,504 | 30 76 |
| 1899..... | 6,981 | 149,190 | 21 37 | 1908..... | 290 | 10,614 | 36 60 |
| 1900..... | 3,513 | 88,052 | 25 06 | 1909..... | 5,063 | 186,778 | 36 89 |
| 1901..... | 57,650 | 593,739 | 10 30 | 1910..... | 9,763 | 296,310 | 30 35 |
| 1902..... | 75,195 | 778,619 | 10 35 | 1911..... | 5,870 | 271,968 | 46 33 |
| 1903..... | 4,400 | 78,382 | 17 81 | 1912..... | 6,976 | 310,702 | 44 54 |
| 1904..... | 21,016 | 200,363 | 9 53 | 1913..... | 6,326 | 351,646 | 55 59 |
| | | | | 1914..... | 19,063 | 486,366 | 25 51 |

Annual Imports of Pig-Iron Since 1880.

| Year. | PIG-IRON. | | | CHARCOAL PIG-IRON. | | | TOTAL. | |
|--------------|------------|-----------|----------------|--------------------|---------|----------------|---------|-----------|
| | Tons. | Value. | Average value. | Tons. | Value. | Average value. | Tons. | Value. |
| | | \$ | \$ cts. | | \$ | \$ cts. | | \$ |
| 1880(c)..... | (a) 23,159 | 371,956 | 16 06 | ..... | ..... | ..... | 23,159 | 371,956 |
| 1881..... | (a) 43,630 | 715,997 | 16 41 | ..... | ..... | ..... | 43,630 | 715,997 |
| 1882..... | 56,594 | 811,221 | 14 33 | 6,837 | 211,791 | 30 98 | 63,431 | 1,023,012 |
| 1883..... | 75,295 | 1,085,755 | 14 42 | 2,198 | 58,994 | 26 84 | 77,493 | 1,144,749 |
| 1884..... | 49,291 | 653,708 | 13 26 | 2,893 | 66,602 | 23 02 | 52,184 | 723,010 |
| 1885..... | 42,279 | 545,426 | 12 90 | 1,119 | 27,333 | 24 43 | 43,398 | 572,759 |
| 1886..... | 42,463 | 528,483 | 12 45 | 3,185 | 60,086 | 18 87 | 45,648 | 588,569 |
| 1887..... | 46,295 | 554,388 | 11 98 | 3,919 | 77,420 | 19 76 | 50,214 | 631,808 |
| 1888..... | (b) 48,973 | 648,012 | 13 23 | ..... | ..... | ..... | 48,973 | 648,012 |
| 1889..... | (b) 72,115 | 864,752 | 11 99 | ..... | ..... | ..... | 72,115 | 864,752 |
| 1890..... | (b) 87,613 | 1,148,078 | 13 10 | ..... | ..... | ..... | 87,613 | 1,148,078 |
| 1891..... | (b) 81,317 | 1,085,929 | 13 35 | ..... | ..... | ..... | 81,317 | 1,085,929 |
| 1892..... | (b) 68,918 | 886,485 | 12 86 | ..... | ..... | ..... | 68,918 | 886,485 |
| 1893..... | 56,849 | 682,209 | 12 00 | 5,944 | 84,358 | 14 19 | 62,793 | 766,567 |
| 1894..... | 42,376 | 483,787 | 11 42 | 2,906 | 34,968 | 12 03 | 45,282 | 518,755 |
| 1895..... | 31,637 | 341,259 | 10 80 | 2,780 | 31,171 | 11 21 | 34,417 | 372,430 |
| 1896..... | 36,131 | 394,591 | 10 92 | 917 | 11,726 | 12 79 | 37,048 | 406,317 |
| 1897..... | 25,766 | 291,788 | 11 32 | 2,936 | 35,373 | 12 05 | 28,702 | 327,161 |
| 1898..... | 37,186 | 382,103 | 10 28 | 2,250 | 23,533 | 10 46 | 39,436 | 405,636 |
| 1899..... | 44,261 | 452,911 | 10 23 | 1,955 | 19,123 | 9 78 | 46,216 | 472,034 |
| 1900..... | 49,767 | 811,490 | 16 31 | 1,816 | 38,736 | 21 33 | 51,583 | 850,226 |
| 1901..... | 35,293 | 548,033 | 15 53 | 490 | 7,121 | 14 53 | 35,783 | 555,154 |
| 1902..... | 39,978 | 585,077 | 14 64 | 38 | 726 | 19 11 | 40,016 | 585,803 |
| 1903..... | 91,730 | 1,338,574 | 14 59 | 882 | 16,352 | 18 54 | 92,612 | 1,354,926 |
| 1904..... | 62,515 | 894,728 | 14 31 | ..... | ..... | ..... | 62,515 | 894,728 |
| 1905..... | 71,005 | 857,879 | 12 08 | ..... | ..... | ..... | 71,005 | 857,879 |
| 1906(c)..... | 96,797 | 1,401,047 | 14 47 | ..... | ..... | ..... | 96,797 | 1,401,047 |
| 1907(d)..... | 150,127 | 2,280,860 | 15 19 | 30 | 675 | 22 33 | 150,157 | 2,281,535 |
| 1908(e)..... | 57,343 | 771,615 | 13 46 | 1,022 | 18,818 | 18 41 | 58,365 | 790,433 |
| 1909..... | 147,925 | 1,798,172 | 12 16 | 413 | 5,727 | 13 87 | 148,338 | 1,803,899 |
| 1910..... | 227,753 | 3,122,695 | 13 71 | 16,106 | 242,152 | 15 03 | 243,859 | 3,364,847 |
| 1911..... | 208,487 | 2,610,989 | 12 52 | ..... | ..... | ..... | 208,487 | 2,610,989 |
| 1912..... | 272,565 | 3,511,599 | 12 88 | 115 | 1,370 | 11 91 | 272,680 | 3,512,969 |
| 1913..... | 235,843 | 3,234,877 | 13 72 | 926 | 12,528 | 13 53 | 236,769 | 3,247,405 |
| 1914(e)..... | 78,594 | 981,107 | 12 48 | 86 | 1,082 | 12 58 | 78,680 | 982,189 |

(a) Comprises pig-iron of all kinds.

(b) These figures appear in Customs reports under heading "iron in pigs, iron kentledge, and cast iron."

(c) Year ending June 30.

(d) Nine months ending March 31.

(e) Calendar year from 1908 to date.

FERRO-PRODUCTS.

Ferro-silicon and ferro-phosphorus were produced in Canada in electric smelting plants during 1914, the latter in small quantities only. Ferro-silicon, both 50 per cent and 75 per cent, was made at Welland, Ont., by the Electro-Metals, Ltd., and ferro-phosphorus, or phosphate of iron at Buckingham, Que., by the Electric Reduction Co., Ltd.

The total production of ferro-products during 1914 was 7,524 tons valued at \$478,355 as against a production of 8,075 tons valued at \$493,018 in 1913. In 1912 the production was 7,834 short tons valued at \$465,225, and in 1911, 7,507 short tons valued at \$376,404.

The exports of ferro-products were formerly included with pig-iron but have been separately tabulated since April 1, 1914. During the nine

months ending December 1914, the exports of ferro-silicon and other ferro-products, as already stated, were 4,865 tons valued at \$285,221.

The imports of ferro-silicon, ferro-manganese, etc., during the calendar year 1914, were 22,147 tons valued at \$549,485, or an average of \$24.81 per ton, as compared with imports during the calendar year 1913, of 30,355 tons valued at \$940,443, or an average of \$30.98 per ton.

The annual imports since 1887 are shown in the following table:—

Imports of Ferro-Manganese, Ferro-Silicon, Etc.

| | Tons. | Value. | Average. value. | | Tons. | Value. | Average. value. |
|--------------|-------|---------|--------------------|------------------|--------|---------|--------------------|
| Fiscal Year. | | \$ | \$ cts. | Fiscal Year. | | \$ | \$ cts. |
| *1887..... | 123 | 1,435 | 11 67 | †1903..... | 6,350 | 162,710 | 25 62 |
| *1888..... | 1,883 | 29,812 | 15 83 | †1904..... | 2,975 | 75,554 | 25 40 |
| *1889..... | 5,868 | 72,108 | 12 29 | †1905..... | 12,935 | 246,815 | 19 08 |
| *1890..... | 696 | 18,895 | 27 15 | †1906..... | 15,023 | 462,739 | 30 80 |
| *1891..... | 2,707 | 40,711 | 15 04 | †1907 (9 mos)... | 16,414 | 610,875 | 37 22 |
| *1892..... | 1,311 | 23,930 | 18 25 | †1908..... | 17,417 | 612,062 | 35 14 |
| *1893..... | 529 | 15,858 | 29 98 | | | | |
| *1894..... | 284 | 9,885 | 34 81 | Calendar Year. | | | |
| †1895..... | 164 | 5,408 | 32 98 | †1909..... | 17,699 | 411,536 | 23 25 |
| †1896..... | 652 | 12,811 | 19 65 | †1910..... | 18,900 | 464,741 | 24 59 |
| †1897..... | 426 | 9,233 | 21 67 | †1911..... | 17,226 | 429,465 | 24 93 |
| †1898..... | 1,418 | 22,516 | 15 88 | †1912..... | 19,810 | 469,884 | 23 72 |
| †1899..... | 1,160 | 22,539 | 19 43 | †1913..... | 30,355 | 990,443 | 30 98 |
| †1900..... | 1,149 | 39,064 | 34 00 | 1914..... | 22,147 | 549,485 | 24 81 |
| †1901..... | 1,512 | 38,954 | 25 76 | | | | |
| †1902..... | 6,513 | 150,977 | 23 18 | | | | |

* These amounts include: ferro-manganese, ferro-silicon, spiegel, steel bloom ends and crop ends of steel rails, for the manufacture of iron and steel.

† Ferro-silicon, spiegeleisen, and ferro-manganese.

CONSUMPTION OF PIG-IRON.

The total quantity of pig-iron ferro-alloys used in Canada in 1914, arrived at by adding to the production, the excess of imports over exports amounted in 1914 to 872,452 tons. Of this amount 639,282 tons were used in steel furnaces, leaving 233,170 tons for foundry and other uses.

Consumption of Pig-Iron and Ferro-Alloys.

| Year. | Total Consumption.* | Used in Steel furnaces. | | Available for foundry and other uses. |
|-----------|------------------------|-------------------------|---------------|---|
| | | Pig-iron. | Ferro-alloys. | |
| | Tons. | Tons. | Tons. | Tons. |
| 1910..... | 1,060,970 | 690,913 | 8,143 | 361,914 |
| 1911..... | 1,144,885 | 700,697 | 21,359 | 422,829 |
| 1912..... | 1,307,820 | 735,559 | 24,237 | 548,024 |
| 1913..... | 1,397,840 | 913,722 | 29,408 | 454,710 |
| 1914..... | 872,452 | 619,030 | 20,252 | 233,170 |

* Production of pig-iron and ferro-alloys plus excess of imports over exports.

STEEL.¹

The production of steel ingots and castings in 1914 was 828,641 tons, as compared with 1,168,993 tons in 1913, and 957,681 tons in 1912. In 1914 the production of open-hearth ingots was reported as 608,383 tons; Bessemer ingots 203,184 tons; direct open-hearth castings 15,315 tons; and other steel castings 1,759 tons. The falling off in production compared with 1913 was 354,578 tons, or 30 per cent.

The production during the past five years is shown in the following table:—

Production of Steel, 1910-14.

| | 1910. | 1911. | 1912. | 1913. | 1914. |
|---|---------|---------|---------|-----------|---------|
| | Tons. | Tons. | Tons. | Tons. | Tons. |
| <i>Ingots</i> —Open-hearth (basic)..... | 580,932 | 651,676 | 692,236 | 824,818 | 608,383 |
| Bessemer (acid)..... | 222,668 | 209,817 | 231,044 | 301,932 | 203,184 |
| <i>Castings</i> —Open-hearth..... | 18,085 | 20,163 | 31,845 | 39,217 | 15,315 |
| Other steels..... | 599 | 740 | 2,556 | 3,026 | 1,759 |
| Total..... | 822,284 | 882,396 | 957,681 | 1,168,993 | 828,641 |

A statistical record of the materials used in steel furnaces has been obtained during the past five years. The total quantity of pig-iron used in steel furnaces during the year 1914 was 619,030 tons, of which 610,645 tons were produced by firms reporting, and 8,385 tons purchased. The quantity of ferro-alloys used was 20,252 tons purchased. Scrap, etc., was used to the extent of 286,863 tons, being 276,596 tons produced by the firms reporting, and 10,267 tons purchased. Ores used included 723 tons of manganese ore and 37,686 tons of iron ore, while 114,859 tons of limestone, or dolomite flux, were used, and 7,845 tons of fluorspar. In Ontario, about 327 million cu. ft. of natural gas were used, while in Nova Scotia coke-oven gas was used at Sydney, of which a record of quantity was not obtained.

The total quantity of pig-iron used in steel furnaces during the year 1913 was 913,722 tons, of which 860,360 tons were produced by firms reporting, and 53,362 tons purchased. The quantity of ferro-alloys used was 29,408 tons purchased. Scrap, etc., was used to the extent of 406,403 tons, being 277,509 tons produced by the firms reporting, and 128,894 tons purchased. Ores used included 1,342 tons of manganese ore and 55,018 tons of iron ore, while 197,028 tons of limestone or dolomite flux were used, and 10,687 tons of fluorspar. In Ontario, a little over 413 million cu. ft. of natural gas were used, while in Nova Scotia coke-oven gas was used at Sydney, of which a record of quantity was not obtained.

In 1912 the total quantity of pig-iron used in steel furnaces was 735,559 tons, of which 706,895 tons were produced by firms reporting, and

¹ The statistics of steel production for 1914 published in the separate report on iron and steel (No. 349) have been revised and corrected in this report.

28,664 tons purchased. The quantity of ferro-alloys used was 24,237 tons purchased. Scrap, etc., was used to the extent of 336,265 tons, being 223,404 tons produced by the firms reporting, and 112,861 tons purchased. Ores used included 985 tons of manganese ore, and 43,006 tons of iron ore, while 148,045 tons of limestone or dolomite flux were used, and 9,709 tons of fluorspar. In Ontario, a little over 423 million cu. ft. of natural gas were used.

Statistics of the production of steel ingots and castings since 1894 are given in the following table, the figures for 1894 to 1906 inclusive having been collected and published by the American Iron and Steel Association; those for the years 1907 to 1914 have been collected by this Department and are shown in detail in the previous table.

Annual Production of Steel Ingots and Castings, 1894-1914.

| Calendar Year. | Short tons. | Calendar Year. | Short tons. | Calendar Year. | Short tons. |
|----------------|-------------|----------------|-------------|----------------|-------------|
| 1894..... | 28,767 | 1901..... | 29,214 | 1908..... | 588,763 |
| 1895..... | 19,040 | 1902..... | 203,881 | 1909..... | 754,719 |
| 1896..... | 17,920 | 1903..... | 203,296 | 1910..... | 822,284 |
| 1897..... | 20,608 | 1904..... | 166,381 | 1911..... | 882,396 |
| 1898..... | 24,125 | 1905..... | 451,863 | 1912..... | 957,681 |
| 1899..... | 24,640 | 1906..... | 639,396 | 1913..... | 1,168,993 |
| 1900..... | 26,406 | 1907..... | 706,982 | 1914..... | 828,641 |

Rolled Products:—Statistics of the production of rolled products and of manufactured steel received from the largest producers, show a production of blooms, billets, slabs, etc., of 802,658 tons, of which 773,249 tons were used by the producer for further manufacture, and 29,409 tons sold to other rolling mills.

The production of rails was 428,226 tons; of wire rods, 63,856 tons; of bars and rods (not including wire rods) 107,054 tons; and of other rolled steel products 37,450 tons. There was also a production of iron bars, etc., amounting to 31,007 tons. The production of steel rails in 1913 was returned as 554,481 tons; in 1912, 471,422 tons; and in 1911, 399,760 tons.

The production of finished rolled iron and steel in Canada from 1910 to 1914 as ascertained and published by the American Iron and Steel Association was as follows, in long tons:—

Annual Production of Rolled Iron and Steel, 1910-1914.

| Products—Gross tons. | 1910. | 1911. | 1912. | 1913. | 1914. |
|---|---------|---------|---------|---------|---------|
| Rails..... | 366,465 | 360,547 | 423,885 | 506,709 | 382,344 |
| Structural shapes and wire rods..... | 80,993 | 76,617 | 64,082 | 68,048 | 59,050 |
| Plates and sheets..... | 26,642 | 14,833 | 373,257 | 392,340 | 218,125 |
| Nail plate, merchant bars, and all other finished rolled forms..... | 265,711 | 323,427 | | | |
| Total..... | 739,811 | 775,424 | 861,224 | 967,097 | 659,519 |

BOUNTIES.

Bounties on iron and steel made in Canada were provided for by the Dominion Government in 1897 under the authority of Chapter 6, Statutes of Canada, 1897. These bounties were continued under subsequent statutes until 1911. Bounty on pig-iron and steel made in electric furnaces was available until December 31, 1912, but no claims therefor were made during the year.

Since 1896 a total of \$16,785,827 has been paid by the Government of Canada in bounties for the production of iron and steel, the annual payments on pig-iron, puddled iron bars, steel, and manufactures of steel, being shown in the following table:—

**Total Bounties on Iron and Steel Paid by the Government of
Canada Since 1896.**

| Year ended. | Pig-iron. | Puddled iron bars. | Steel. | Manufact- ures of steel. |
|--------------------------------|-----------|-----------------------|-----------|-----------------------------|
| | \$ | \$ | \$ | \$ |
| June 30, 1896..... | 104,105 | 5,611 | 59,499 | ..... |
| " 1897..... | 66,509 | 3,019 | 17,366 | ..... |
| " 1898..... | 165,654 | 7,706 | 67,454 | ..... |
| " 1899..... | 187,954 | 17,511 | 74,644 | ..... |
| " 1900..... | 238,296 | 10,121 | 64,360 | ..... |
| " 1901..... | 351,259 | 16,703 | 100,058 | ..... |
| " 1902..... | 693,108 | 20,550 | 77,431 | ..... |
| " 1903..... | 666,001 | 6,702 | 729,102 | ..... |
| " 1904..... | 533,982 | 11,669 | 347,990 | 15,321 |
| " 1905..... | 624,667 | 7,895 | 676,318 | 231,324 |
| " 1906..... | 687,632 | 5,875 | 941,000 | 369,832 |
| March 31, 1907 (9 months)..... | 385,231 | 312 | 575,259 | 338,999 |
| " 1908..... | 863,817 | ..... | 1,092,201 | 347,135 |
| " 1909..... | 693,423 | ..... | 838,100 | 333,091 |
| " 1910..... | 573,969 | ..... | 695,752 | 538,812 |
| " 1911..... | 261,434 | ..... | 350,456 | 526,858 |
| " 1912..... | ..... | ..... | ..... | 166,750 |
| " 1913..... | ..... | ..... | ..... | ..... |
| Total..... | 7,097,041 | 113,674 | 6,706,990 | 2,868,122 |

EXPORTS AND IMPORTS OF IRON AND STEEL GOODS.

The exports of iron and steel from Canada consist chiefly of manufactured goods such as agricultural implements, automobiles, bicycles, machinery, etc. Compared with the value of imports, the total value of the exports is small, amounting to not more than 10 per cent of the former. The total value of iron and steel exported during the calendar year 1914 was \$14,391,746, as compared with a value of exports in 1913 of \$13,999,149, and in 1912 of \$10,682,484. The exports during 1914 included: pig-iron and ferro-products, etc., to the value of \$486,366; scrap iron and steel valued at \$446,337; manufactures of iron and steel \$4,260,395; agricultural implements \$5,788,899; automobiles and bicycles \$3,409,749.

The exports during 1913 in similar groupings were pig-iron and ferro-products \$351,646; scrap-iron and steel \$483,813; manufactures of iron and steel \$2,121,480; agricultural implements \$7,411,246; automobiles and bicycles \$3,630,964.

The exports during 1912 in similar groupings were: pig-iron and ferro-products, etc., \$310,702; scrap iron and steel \$145,250; manufactures of iron and steel \$2,076,493; agricultural implements, \$5,967,545; automobiles and bicycles \$2,182,494.

A detailed record of these exports during the past two years is shown in the accompanying table.

Exports of Iron and Steel Goods, the Product of Canada, during the Calendar Years 1913 and 1914.

| | 1913. | | | 1914. | | |
|---|-----------|------------|----------------|-----------|------------|----------------|
| | Quantity. | Value. | Average value. | Quantity. | Value. | Average value. |
| | | \$ | \$ cts. | | \$ | \$ cts. |
| Stoves.....No. | 1,371 | 23,858 | 17 40 | 4,198 | 25,149 | 5 99 |
| Gas buoys and parts of....." | | 35,462 | | | 21,009 | |
| Castings, n.e.s....." | | 61,362 | | | 24,218 | |
| Pig-iron.....Tons | 6,326 | 351,646 | 55 59 | 14,198 | 201,145 | 14 17 |
| Ferro-silicon and ferro-compounds....." | | | | 4,865 | 285,221 | 57 45 |
| Wire and wire-nails....." | | | | 9,663 | 355,781 | 36 82 |
| Machinery (linotype machines).....\$ | | 9,631 | | | 5,562 | |
| Machinery, n.e.s....." | | 435,333 | | | 344,689 | |
| Sewing machines.....No. | 8,122 | 114,438 | 14 09 | 2,109 | 31,392 | 14 88 |
| Washing machines, etc.....\$ | | 15,872 | | | 33,986 | |
| Typewriters.....No. | 3,048 | 201,763 | 66 20 | 3,055 | 200,441 | 65 61 |
| Scrap iron and steel.....Tons | 45,556 | 483,813 | 10 62 | 35,405 | 446,337 | 12 60 |
| Hardware, tools, etc.....\$ | | 101,990 | | | 95,497 | |
| Hardware, n.e.s....." | | 70,767 | | | 190,763 | |
| Steel and manufactures of....." | | 1,051,004 | | | 2,931,908 | |
| Agricultural implements— | | | | | | |
| Mowing machines.....No. | 24,044 | 847,253 | 35 24 | 21,457 | 725,831 | 33 83 |
| Reapers....." | 5,604 | 317,716 | 56 69 | 3,919 | 223,228 | 56 96 |
| Drills....." | 10,364 | 634,121 | 61 18 | 3,961 | 259,701 | 65 56 |
| Harvesters....." | 23,194 | 2,439,319 | 105 17 | 19,474 | 2,015,996 | 103 52 |
| Ploughs....." | 15,450 | 465,505 | 30 13 | 12,896 | 324,349 | 25 15 |
| Harrows....." | 7,300 | 127,482 | 17 46 | 6,252 | 92,556 | 14 80 |
| Hay rakes....." | 9,846 | 247,445 | 25 13 | 6,524 | 196,519 | 30 12 |
| Seeders....." | | | | 32 | 1,810 | 56 56 |
| Threshing machines....." | 1,928 | 712,270 | 369 43 | 1,965 | 799,307 | 406 77 |
| Cultivators....." | 7,795 | 201,758 | 25 88 | 6,030 | 146,668 | 24 32 |
| All other....." | | 503,235 | | | 290,520 | |
| Parts of....." | | 915,142 | | | 712,414 | |
| Automobiles....." | 5,997 | 3,395,382 | 566 18 | 5,621 | 3,011,327 | 535 73 |
| parts of....." | | 210,623 | | | 384,428 | |
| Bicycles....." | 90 | 8,058 | 89 53 | 111 | 10,021 | 90 28 |
| parts of....." | | 16,901 | | | 3,973 | |
| Total..... | | 13,999,149 | | | 14,391,746 | |

Annual Exports of Iron and Steel Products since 1884.

| Year. | Value. | Year. | Value. | Year. | Value. |
|-----------|---------|-----------|-----------|-----------|------------|
| | \$ | | \$ | | \$ |
| 1884..... | 186,854 | 1895..... | 174,778 | 1906..... | 1,552,963 |
| 1885..... | 115,158 | 1896..... | 284,296 | 1907..... | 1,607,368 |
| 1886..... | 228,027 | 1897..... | 592,849 | 1908..... | 2,098,138 |
| 1887..... | 251,221 | 1898..... | 593,060 | 1909* | 7,172,413 |
| 1888..... | 184,214 | 1899..... | 975,377 | 1910..... | 7,895,489 |
| 1889..... | 144,909 | 1900..... | 1,570,013 | 1911..... | 9,907,281 |
| 1890..... | 133,724 | 1901..... | 1,837,179 | 1912..... | 10,682,484 |
| 1891..... | 152,919 | 1902..... | 2,751,324 | 1913..... | 13,999,149 |
| 1892..... | 155,597 | 1903..... | 3,058,320 | 1914..... | 14,391,746 |
| 1893..... | 214,636 | 1904..... | 1,318,482 | | |
| 1894..... | 167,183 | 1905..... | 1,287,558 | | |

* Agricultural implements, automobiles, and bicycles included in 1909 and subsequent years.

The total value of the imports of iron and steel goods during the calendar year 1914 was \$79,762,262, as compared with a value of \$145,226,972 imported during the calendar year 1913, showing a decrease of over 45 per cent. Previous to 1913 the record is shown covering the fiscal periods. During the twelve months ending March 1913, the imports were valued at \$148,579,272 as against imports valued at \$105,614,450 during the twelve months ending March 1911.

Between 1895 and 1904 the imports of iron and steel increased from about \$8,600,000 to over \$40,000,000. During the next five years there was comparatively little change, but from 1909 to 1913 the increase was again very rapid. During the latter part of 1913 there was, however, a distinct check to imports with the heavy falling off shown in 1914. A detailed statement of the imports of iron and steel during the calendar years 1914 and 1913, is shown in the general tables of imports of iron and steel goods following.

The imports during 1914 subject to duty were valued at \$64,901,486, the imports duty free during the same period being valued at \$14,860,776. The imports during 1913, subject to duty were valued at \$125,082,378, and the imports duty free during the same period were valued at \$20,144,594. These imports include all classes of iron and steel goods manufactured as well as those of the cruder form. In many cases the values only of the imported goods are given, so that a total tonnage of imports cannot be stated. In the case of most of the cruder materials, however, the quantities are given, and a compilation of these showing the importation of the cruder forms of iron and steel since 1909 is shown in the accompanying table. Thus during the twelve months ending December, 1914, there were imported 882,636 tons of iron and steel valued at \$28,523,956, or an average value per ton of \$32.32 together with other iron and steel goods of which the quantities are not stated, valued at \$51,238,306.

During the twelve months ending December, 1913, there were imported 1,890,506 tons of iron and steel goods valued at \$59,882,222, or an

average value per ton of \$31.67, together with other iron and steel goods of which the quantities are not stated, valued at \$85,344,750.

A decrease in the imports of each class of product is shown in 1914, with the exception of wire, the imports of which increased about 10 per cent.

The imports of pig-iron in 1914 were 78,680 tons as against 236,769 tons in 1913, a decrease of 158,089 tons, or 66.77 per cent; ferro-products and chrome steel 22,271 tons in 1914 as against 30,678 tons in 1913, a falling off of 8,407 tons or 27.40 per cent; ingots, blooms, billets, etc., 13,049 tons as against 52,872 tons, a decrease of 39,823 tons, or 75.32 per cent; scrap iron and steel 27,688 tons compared with 104,747 tons, a decrease of 77,059 tons, or 73.57 per cent; plates and sheets 221,203 tons as against 365,675 tons, a decrease of 144,472 tons or 39.51 per cent; tin plates and sheets 50,791 tons as against 58,031 tons, a decrease of 7,240 tons, or 12.48 per cent, bars, rods, hoops, etc., 148,368 tons compared with 227,879 tons, a decrease of 79,511 tons, or 34.89 per cent; structural iron and steel 160,538 tons in 1914 as against 439,871 tons in 1913, a decrease of 279,333 tons or 63.50 per cent; rails and connexions 42,064 tons compared with 182,421 tons, a decrease of 140,357 tons, or 76.94 per cent; pipe and fittings 4,864 tons compared with 30,663 tons, a decrease of 25,799 tons, or 84.14 per cent; wire 77,167 tons in 1914 compared with 70,712 tons in 1913, an increase of 6,455 tons or 9.13 per cent; forgings, castings, etc., 20,339 tons as against 32,604 tons, a decrease of 12,265 tons, or 37.62 per cent.

A very large proportion of these imports is derived from the United States, and a record has been compiled from the "Commerce and Navigation of the United States" showing the exports of iron and steel goods from that country to Canada.

According to this authority there were exported to Canada from United States during the twelve months ending June 30, 1914, 1,169,349 tons of iron and steel goods, valued at \$35,921,812, together with other iron and steel goods of which the weight is not given valued at \$40,731,318 or a total value of \$76,653,130.

During the twelve months ending June 30, 1913, the corresponding exports to Canada were 1,695,916 tons of iron and steel goods valued at \$51,936,616, together with other iron and steel goods of which the weight is not given, valued at \$54,673,774 or a total value of \$106,610,390.

During the twelve months ending June 30, 1912, exports to Canada were 1,175,464 tons valued at \$36,637,305, together with other iron and steel goods valued at \$46,020,989, or a total value of \$82,658,294.

Summary of Imports of Iron and Steel, 1914.

| Material. | Tons. | Value. | Average. |
|---|---------|------------|----------|
| | | \$ | \$ cts. |
| Pig-iron..... | 78,680 | 982,189 | 12 48 |
| Ferro-products and chrome steel..... | 22,271 | 560,686 | 25 18 |
| Ingots, blooms, billets, puddled bars, etc..... | 13,049 | 259,703 | 19 90 |
| Scrap iron and scrap steel..... | 27,688 | 337,406 | 12 19 |
| Plates and sheets..... | 221,203 | 7,576,312 | 34 25 |
| Tin plates and sheets..... | 50,791 | 3,151,385 | 62 05 |
| Bars, rods, hoops, bands, etc..... | 148,368 | 5,138,193 | 34 63 |
| Structural iron and steel..... | 160,538 | 4,214,520 | 26 25 |
| Rails and connexions..... | 42,064 | 1,116,773 | 26 55 |
| Pipe and fittings (a)..... | 15,614 | 395,466 | 25 33 |
| Nails and spikes..... | 4,864 | 210,098 | 43 20 |
| Wire (a)..... | 77,167 | 3,205,635 | 41 54 |
| Forgings, castings, and manufactures..... | 20,339 | 1,375,590 | 67 63 |
| Total..... | 882,636 | 28,523,956 | 32 32 |
| Other iron and steel products valued at..... | | 51,238,306 | |
| Total value of imports of iron and steel..... | | 79,762,262 | |

Summary of Imports of Iron and Steel,* 1913.

| Material. | Tons. | Value. | Average. |
|---|-----------|-------------|----------|
| | | \$ | \$ cts. |
| Pig-iron..... | 236,769 | 3,247,405 | 13 72 |
| Ferro-products and chrome steel..... | 30,678 | 970,100 | 31 62 |
| Ingots, blooms, billets, puddled bars, etc..... | 52,872 | 1,212,314 | 22 93 |
| Scrap iron and scrap steel..... | 104,747 | 1,488,255 | 14 21 |
| Plates and sheets..... | 365,675 | 13,965,865 | 38 19 |
| Tin plates and sheets..... | 58,031 | 3,954,615 | 68 14 |
| Bars, rods, hoops, bands, etc..... | 277,879 | 10,195,280 | 36 69 |
| Structural iron and steel..... | 439,871 | 12,739,954 | 28 96 |
| Rails and connexions..... | 182,421 | 5,120,830 | 28 07 |
| Pipe and fittings (a)..... | 30,663 | 847,922 | 27 65 |
| Nails and spikes..... | 7,584 | 360,489 | 47 53 |
| Wire (a)..... | 70,712 | 3,688,660 | 52 16 |
| Forgings, castings, and manufactures..... | 32,604 | 2,090,533 | 64 12 |
| Total..... | 1,890,506 | 59,882,222 | 31 67 |
| Other iron and steel products valued at..... | | 85,344,750 | |
| Total value of imports of iron and steel..... | | 145,226,972 | |

* For details of these items see general tables following.

(a) There are additional imports of pipe and wire included under "other iron and steel products."

Summary of Tonnage of Iron and Steel Imported 1909-1913.

| Material. | TWELVE MONTHS ENDING MARCH. | | | | |
|---|-----------------------------|---------|-----------|-----------|-----------|
| | 1909. | 1910. | 1911. | 1912. | 1913. |
| | Tons. | Tons. | Tons. | Tons. | Tons. |
| Pig-iron..... | 58,591 | 159,506 | 270,102 | 201,112 | 291,904 |
| Ferro-products and chrome steel..... | 13,206 | 15,153 | 19,182 | 18,548 | 23,378 |
| Ingots, blooms, billets, puddled bars, etc..... | 8,887 | 36,819 | 48,395 | 89,190 | 86,745 |
| Scrap iron and scrap steel..... | 26,212 | 28,797 | 53,824 | 78,378 | 103,317 |
| Plates and sheets..... | 116,610 | 200,575 | 205,690 | 243,461 | 376,633 |
| Tin plates and sheets..... | 26,859 | 39,866 | 44,025 | 45,802 | 64,571 |
| Bars, rods, hoops, bands, etc..... | 73,261 | 117,159 | 183,865 | 195,139 | 278,878 |
| Structural iron and steel..... | 162,735 | 195,748 | 232,585 | 268,572 | 377,551 |
| Rails and connexions..... | 32,543 | 55,183 | 36,690 | 97,062 | 156,318 |
| Pipe and fittings..... | 18,309 | 16,705 | 28,831 | 26,627 | 40,987 |
| Nails and spikes..... | 1,611 | 3,476 | 3,374 | 7,201 | 11,420 |
| Wire..... | 39,375 | 68,211 | 64,850 | 69,597 | 80,846 |
| Forgings, castings, and manufactures..... | 14,394 | 18,093 | 24,523 | 27,668 | 47,195 |
| Total..... | 592,593 | 955,291 | 1,215,936 | 1,368,357 | 1,939,743 |

Annual Imports of Iron and Steel Products since 1895.

| Year. | Value. | Year. | Value. |
|---------------------------|------------|-------------------------------|-------------|
| Twelve months ending June | \$ | Twelve months ending March | \$ |
| 1895..... | 8,684,024 | 1907*..... | 44,739,403 |
| 1896..... | 10,206,759 | 1908..... | 64,257,238 |
| 1897..... | 11,063,156 | 1909..... | 42,075,797 |
| 1898..... | 16,340,992 | 1910..... | 62,356,974 |
| 1899..... | 19,463,329 | 1911..... | 88,179,152 |
| 1900..... | 27,926,766 | 1912..... | 105,614,450 |
| 1901..... | 25,023,453 | 1913..... | 148,579,272 |
| 1902..... | 31,591,488 | Twelve months ending December | |
| 1903..... | 39,536,867 | 1913..... | 145,226,972 |
| 1904..... | 40,449,175 | 1914..... | 79,762,262 |
| 1905..... | 40,820,233 | | |
| 1906..... | 42,210,305 | | |

*Nine months.

Annual Imports of Tin Plate.

| Year. | Tons. | Value. | Year. | Tons. | Value. |
|--------------|--------|-----------|----------------|--------|-----------|
| Fiscal Year. | | \$ | Fiscal Year | | \$ |
| 1891..... | 10,734 | 854,770 | 1904..... | 24,820 | 1,461,811 |
| 1892..... | 19,296 | 1,235,961 | 1905..... | 30,000 | 1,751,507 |
| 1893..... | 15,131 | 892,106 | 1906..... | 30,259 | 1,869,000 |
| 1894..... | 15,369 | 956,813 | 1907..... | 22,628 | 1,516,777 |
| 1895..... | 13,022 | 681,739 | 1908..... | 34,876 | 2,437,540 |
| 1896..... | 16,910 | 923,279 | 1909..... | 26,859 | 1,682,366 |
| 1897..... | 18,768 | 919,596 | Calendar Year: | | |
| 1898..... | 22,864 | 1,150,741 | 1909..... | 36,904 | 2,216,089 |
| 1899..... | 16,575 | 927,036 | 1910..... | 39,101 | 2,475,010 |
| 1900..... | 25,108 | 1,683,788 | 1911..... | 47,006 | 3,172,943 |
| 1901..... | 27,165 | 1,466,965 | 1912..... | 60,502 | 3,826,735 |
| 1902..... | 27,207 | 1,528,655 | 1913..... | 58,031 | 3,954,615 |
| 1903..... | 30,251 | 1,806,643 | 1914..... | 50,791 | 3,151,385 |

Imports of Iron and Steel Goods Subject to Duty.

| Material. | CALENDAR YEAR 1913. | | | | CALENDAR YEAR 1914. | | | |
|---|---------------------|-----------|-----------------|-----------|---------------------|-----------------|--|--|
| | Quantity. | Value. | Value per unit. | Quantity. | Value. | Value per unit. | | |
| | | | | | | | | |
| Agricultural implements, n.o.p. viz.— | | | | | | | | |
| Binding attachments..... | | \$ | | | \$ | \$ cts. | | |
| Cultivators and weeders..... | No. | 33,319 | | | 3,548 | | | |
| Drills, seed..... | 7,295 | 60,426 | 33 14 | | 48,246 | | | |
| Farm, road, or field rollers..... | 617 | 241,749 | 209 51 | 3,928 | 58,886 | 14 98 | | |
| Forks, pronged..... | 16,143 | 129,269 | 0 43 | 9,168 | 122,429 | 276 36 | | |
| Harrows..... | 3,642 | 198,020 | 54 37 | | 5,218 | 0 57 | | |
| Harvesters, self-binding..... | 3,796 | 337,849 | 89 00 | 1,676 | 79,107 | | | |
| Hay loaders..... | 478 | 37,742 | 79 00 | 219 | 181,210 | 108 12 | | |
| Hay tedders..... | 6 | 24,206 | 50 64 | 219 | 10,966 | 50 07 | | |
| Hoes..... | 9 | 126 | 21 00 | 15 | 607 | 40 47 | | |
| Horse rakes..... | 9,052 | 2,344 | 0 26 | 9,950 | 2,775 | 0 28 | | |
| Knives, hay or straw..... | 1,466 | 41,868 | 28 56 | 770 | 14,754 | 19 16 | | |
| Knives edging..... | 14,719 | 4,325 | 0 29 | 4,835 | 2,061 | 0 43 | | |
| Knives edging..... | 2,838 | 1,646 | 0 58 | | 88 | 0 64 | | |
| Lawn mowers..... | 15,701 | 64,828 | 4 13 | 14,258 | 59,424 | 4 17 | | |
| Manure spreaders..... | 499 | 33,502 | 67 14 | 1,037 | 66,309 | 63 94 | | |
| Mowing machines..... | 1,439 | 47,765 | 33 19 | 1,260 | 46,042 | 37 33 | | |
| Ploughs..... | | 1,366,959 | | | 501,704 | | | |
| Post hole diggers..... | 3,517 | 5,005 | 1 42 | 4,691 | 4,495 | 0 96 | | |
| Potato diggers..... | 1,618 | 54,222 | 33 51 | 1,435 | 44,036 | 30 69 | | |
| Rakes, n.o.p..... | 20,868 | 5,744 | 0 28 | 26,552 | 5,346 | 0 20 | | |
| Reapers..... | 679 | 40,402 | 59 50 | 395 | 30,434 | 77 05 | | |
| Scythes..... | 2,661 | 13,037 | 4 90 | 3,029 | 14,805 | 4 89 | | |
| Sickles or reaping hooks..... | 516 | 1,212 | 2 35 | 289 | 631 | 2 18 | | |
| Snaths..... | 3 | 17 | 5 67 | 10 | 17 | 1 70 | | |
| Spades and shovels of iron or steel, n.o.p..... | 9,566 | 42,910 | 4 49 | 4,694 | 19,438 | 4 14 | | |
| Spade and shovel blanks, and iron or steel cut to shape for the same..... | 1,021 | 2,259 | 2 21 | 1,549 | 2,883 | 1 86 | | |
| Parts of agricultural implements paying 12½ per cent and 17½ per cent..... | | 590,256 | | | 191,070 | | | |
| Parts of agricultural implements paying 12½, 17½, and 20 per cent..... | | 680,973 | | | 204,874 | | | |
| All other agricultural implements, n.o.p..... | | 106,736 | | | 81,867 | | | |
| Anvils and vices..... | | 99,339 | | | 54,163 | | | |
| Cart or wagon skins or boxes..... | 217 9 | 15,862 | 72 79 | 190 5 | 20,714 | 108 73 | | |
| Springs, n.o.p., and parts thereof, of iron or steel for railway, tramway, or other vehicles..... | | 162,557 | | | 65,206 | | | |
| Axle and axle parts, n.o.p., and axle blanks and parts thereof, of iron or steel for railway, tramway, or other vehicles..... | | 621,777 | | | 221,513 | | | |
| Bar iron or steel, rolled, whether in coils, bundles, rod or bars, comprising rounds, ovals, squares, and flats, n.o.p..... | | 4,381,341 | 31 31 | 49,693 8 | 1,442,734 | 29 03 | | |
| Butts and hinges, n.o.p..... | 139,932 6 | 156,840 | | | 92,375 | | | |

Imports of Iron and Steel Goods Subject to Duty—Continued.

| Material. | CALENDAR YEAR, 1913. | | | CALENDAR YEAR, 1914. | | |
|---|----------------------|-----------|-----------------|----------------------|-----------|-----------------|
| | Quantity. | Value. | Value per unit. | Quantity. | Value. | Value per unit. |
| | | \$ | \$ cts. | | \$ | \$ cts. |
| Canada plates, Russia iron, terne plate, and rolled sheets of iron and steel coated with zinc spelter or other metal, of all widths or thicknesses, n.o.p. | 8,639.2 | 490,791 | 56 81 | 8,369.9 | 435,622 | 52 05 |
| Castings, iron or steel, n.o.p. .... | ..... | 1,644,991 | ..... | ..... | 681,523 | ..... |
| Castings, malleable iron, when imported by manufacturers of mowers, binders, harvesters and reapers for use exclusively in their own factories. .... | ..... | ..... | ..... | ..... | 71,812 | ..... |
| Cast-iron pipe of every description. | 30,662.5 | 847,922 | 27 65 | 15,614.1 | 395,466 | 25 33 |
| Cast scrap iron. | 49,874.0 | 659,319 | 13 22 | 10,162 | 118,299 | 11 64 |
| Chains, coil chain, chain links, and chain shackles of iron or steel of $\frac{1}{4}$ " diameter, and over. | 3,112.8 | 217,175 | 69 77 | 1,012.6 | 82,957 | 81 92 |
| Chains, coil chains and links, including repair links and chain shackles of iron and steel n.o.p. .... | ..... | ..... | ..... | 698.5 | 55,321 | 79 20 |
| Chains, shoe. | 24.2 | 158,914 | 129 88 | ..... | 95,421 | ..... |
| Nails, brads, spikes, and tacks of all kinds, n.o.p. | 317 | 3,143 | 140 33 | 324.4 | 2,105 | 141 28 |
| Engines, etc. .... | ..... | 44,486 | ..... | ..... | 38,001 | 117 14 |
| Locomotives for railways. | 171 | 692,370 | 4,048 95 | 89 | 260,345 | 2,925 22 |
| Locomotive parts. .... | ..... | 144,309 | ..... | ..... | 76,444 | ..... |
| Motor cars for railway and tramways. | 109 | 199,945 | 1,834 36 | 23 | 47,967 | 2,085 52 |
| Engines, fire. | 15 | 61,984 | 4,132 27 | 28 | 105,572 | 3,770 40 |
| Engines, gasoline. | 25,126 | 3,150,314 | 125 38 | 15,392 | 1,959,637 | 127 31 |
| Engines, steam. | 476 | 547,866 | 1,150 98 | 356 | 248,820 | 698 93 |
| Boilers, steam. .... | ..... | 454,726 | ..... | ..... | 236,691 | ..... |
| Boilers, n.o.p. .... | ..... | 337,390 | ..... | ..... | 278,262 | ..... |
| Fire extinguishing machines, including sprinklers for fire protection. .... | ..... | 125,861 | ..... | ..... | 103,316 | ..... |
| Fittings, iron or steel, for iron or steel pipe of every description. .... | ..... | 1,165,364 | ..... | ..... | 780,884 | ..... |
| Flat eye-bar blanks, not punched or drilled, for use exclusively in the manufacture of bridges or of steel structural work, or in car construction. | 567 | 16,853 | 29 72 | 3,035 | 206,456 | 68 02 |
| Ferro-silicon, spiegeleisen, and ferro-manganese. | 30,355 | 940,443 | 30 98 | 5,741 | 152,245 | 26 52 |
| Ferro-silicon, containing more than 15% silicon. .... | ..... | ..... | ..... | 1 | 88 | 88 00 |
| Spiegeleisen and ferro-manganese containing not more than 15% manganese. .... | ..... | ..... | ..... | 2,375 | 68,445 | 28 82 |
| Forging of iron and steel of whatever size, shape, or in whatever stage of manufacture, n.o.p.; and steel shafting turned, compressed or polished and hammered, drawn or cold rolled, iron or steel bars or shapes, n.o.p. .... | ..... | ..... | ..... | ..... | ..... | ..... |
| Hardware, viz., builders, cabinet-makers, upholsterers, harness-makers, saddlers, and carriage hardware, including curry-combs, n.o.p. | 2,442.1 | 263,975 | 108 09 | 1,568.6 | 174,742 | 11 14 |
| Horse, mule, and ox shoes. .... | ..... | 956,703 | ..... | ..... | 627,968 | ..... |
| Iron or steel billets, weighing not less than 60 pounds per lineal yard. | 51,765.4 | 1,178,151 | 22 76 | 12,247 | 241,234 | 19 70 |

| Iron or steel ingots, cogged ingots, blooms, slabs, puddled bars and loops, or other forms, n.o.p., less finished than iron or steel bars, but more advanced than pig-iron except castings..... | a | 654.5 | 19,379 | 29 61 | 154.6 | 3,348 | 21 65 |
|---|------|---------|-----------|----------|--------|-----------|----------|
| | | | | | | | |
| Iron or steel bridges or parts thereof, iron or steel structural work, columns, shapes or sections, drilled, punched, or in any further stage of manufacture, than as rolled of cast, n.o.p..... | Tons | 235,843 | 971,735 | 13 72 | 78,594 | 515,223 | |
| Iron in pig..... | Tons | 926 | 3,234,827 | 13 55 | 86 | 981,107 | 12 48 |
| Locks of all kinds..... | | | 42,528 | | | 1,082 | 12 38 |
| Machines, tools, and etc..... | | | 568,263 | | | 254,699 | |
| Automobiles and motor vehicles of all kinds..... | No. | 6,956 | 8,233,529 | 1,183 66 | 5,599 | 5,296,831 | 946 03 |
| Automobiles and motor vehicles, parts of..... | No. | 360 | 3,004,156 | | | 2,788,154 | |
| Cranes and derricks..... | No. | | 850,680 | 2,363 02 | 145 | 448,076 | 3,000 87 |
| Dental engines..... | a | | | | | 85 10 | |
| Drainage mills..... | a | 1,190 | 22,915 | 19 11 | 783 | 18,000 | 85 10 |
| Grain crushers..... | a | 421 | 6,469 | 15 37 | 366 | 6,593 | 23 01 |
| Hay presses..... | a | 219 | 43,779 | 199 90 | 188 | 31,349 | 166 75 |
| Windmills and complete parts thereof..... | a | | 43,562 | | | 50,396 | |
| Ore crushers and rock crushers, stamp mills, cornish and belted rolls, rock drills, air compressors, cranes, derricks, and percussion coal cutters..... | | | | | | | |
| Portable machines..... | \$ | | 601,531 | | | 459,531 | |
| Fodder or feed cutters..... | No. | 2,053 | 19,016 | 9 26 | 665 | 10,506 | 15 80 |
| Horse powers for farm purposes..... | a | 12 | 265 | 22 09 | 3 | 93 | 31 00 |
| Portable engines with boilers in combination and traction engines for farm purposes..... | a | | | | | | |
| Portable sawmills and planing mills..... | a | 1,864 | 3,539,078 | 1,898 65 | 532 | 854,364 | 1,605 95 |
| Steam shovels..... | a | 31 | 10,284 | 331 74 | 12 | 3,261 | 271 35 |
| Threshing machine separators..... | a | 97 | 603,827 | 6,225 04 | 29 | 215,356 | 7,420 07 |
| Threshing machine separators, parts of, including wind-stackers, baggers, weighers and self-feeders for same, and finished parts thereof for repairs, when imported separately..... | a | 1,820 | 1,025,296 | 563 35 | 607 | 308,283 | 507 88 |
| All other portable machines, n.o.p., and parts..... | \$ | | 499,832 | | | 223,009 | |
| Concrete mixing machines..... | No. | | 60,552 | | | 119,758 | |
| Sewing machines..... | No. | 208 | 110,059 | 529 13 | 156 | 66,121 | 423 85 |
| Sewing machines, parts of..... | \$ | 18,446 | 364,265 | 19 75 | 15,667 | 281,164 | 17 95 |
| Adding machines..... | No. | | 119,061 | | | 73,434 | |
| Machines typewriting..... | No. | 1,678 | 269,358 | 160 52 | | 269,766 | 183 51 |
| Machines type-casting and type-setting, and parts thereof, adapted for use in printing offices..... | a | 13,997 | 848,834 | 60 64 | 9,051 | 514,831 | 50 88 |
| Machines specially designed for ruling, folding, binding, embossing, creasing, or cutting paper or cardboard, when for use exclusively by printers, bookbinders, and by manufacturers of articles made from paper or cardboard, including parts thereof, composed wholly or in part of iron, steel, brass, or wood..... | a | | 150,975 | | | | |
| Lithographic presses and type-making accessories for same..... | \$ | | 363,600 | | | 231,832 | |
| Printing presses..... | a | | 610,189 | | | 308,907 | |
| Type-making accessories for printing..... | a | | | | | | |
| Cement making machines..... | a | | 187,901 | | | 16,574 | |
| Coal handling machines..... | a | | 120,359 | | | 49,097 | |
| Paper and pulp mill machines..... | a | | 417,898 | | | 190,500 | |
| Rolling mill machines..... | a | | 123,758 | | | 414,396 | |
| Sawmill machines..... | a | | 189,976 | | | 147,219 | |
| Machinery of a class or kind not made in Canada and parts thereof adapted for carding, spinning, weaving, braiding, or knitting fibrous material, when imported by manufacturers for such purposes..... | a | | 2,180,923 | | | 140,699 | |
| | | | | | | 581,918 | |

Imports of Iron and Steel Goods Subject to Duty.—Continued.

| Material. | CALENDAR YEAR, 1913. | | | | CALENDAR YEAR, 1914. | | | |
|--|----------------------|------------|-----------------|--|----------------------|------------|-----------------|--|
| | Quantity. | Value. | Value per unit. | | Quantity. | Value. | Value per unit. | |
| All machinery composed wholly or in part of iron or steel, n.o.p., and iron or steel castings, and iron or steel integral parts of all machinery specified in tariff item 453..... | | | | | | | | |
| Machines, washing..... | 9,578 | 17,118,296 | 9 23 | | 8,440 | 10,327,957 | 8 30 | |
| Nails and spikes, composition and sheathing nails..... | 202.8 | 17,725 | 60 31 | | 87.7 | 70,030 | 51 46 | |
| Nails and spikes, cut (ordinary builders)..... | 5,272.6 | 9,127 | 45 00 | | 2,997.6 | 4,513 | 36 85 | |
| Railway spikes..... | 1,473.1 | 194,194 | 36 83 | | 2,611.3 | 9,629 | 31 01 | |
| Nails, wire of all kinds, n.o.p..... | 32,662 | 91,814 | 62 33 | | 1,177.9 | 92,966 | 53 39 | |
| Pumps, hand, n.o.p..... | 1,707 | 131,463 | 4 02 | | 21,887 | 62,884 | 5 08 | |
| Pumps, power and parts of..... | | 277,709 | 162 69 | | 2,985 | 111,113 | 143 08 | |
| Iron and steel railway bars or rails of any form, punched or not, n.o.p., for railways which term for the purposes of this item shall include all kinds of railways, street railways and tramways, even although they are used for private purposes only, and even although they are not used or intended to be used in connexion with the business of common carrying of goods or passengers..... | 177,041 | 4,886,117 | 27 59 | | 38,496 | 979,723 | 25 45 | |
| Railway fish plates..... | 3,366 | 146,493 | 43 52 | | 2,900 | 113,913 | 39 28 | |
| Rolled iron or steel angles, tees, beams, channels, girders and other rolled shapes or sections, not punched or drilled or further manufactured than rolled, n.o.p..... | 2,014 | 88,220 | 43 80 | | 668 | 23,137 | 34 64 | |
| Rolled iron or steel beams, channels, angles, and other rolled shapes of iron and steel, not punched, drilled or further manufactured than rolled, weighing not less than 35 pounds per lineal yard, not being square, flat, oval, or round shapes, and not being railway bars or rails..... | 107,494.8 | 3,201,384 | 29 78 | | 33,927.6 | 920,350 | 27 13 | |
| Rolled iron or steel hoop, band, scroll, or strip, 12 inches or less in width, No. 13 gauge and thicker, n.o.p..... | 249,435.1 | 7,074,279 | 28 36 | | 82,448.7 | 2,103,032 | 25 51 | |
| Rolled hoop iron or hoop steel galvanized, No. 12 and 13 gauge..... | 7,342.6 | 246,635 | 33 59 | | 3,439.7 | 114,498 | 33 29 | |
| Rolled iron or steel, hoop, band, scroll, or strip, No. 14 gauge and thinner, galvanized or coated with other metal or not, n.o.p..... | 13,985.8 | 651,338 | 46 57 | | 40.9 | 1,800 | 44 00 | |
| Rolled iron or steel sheets or plates, sheared or unsheared, and skelp iron or steel, sheared or rolled grooves, n.o.p..... | 47,444.4 | 1,517,344 | 31 98 | | 10,391.9 | 451,814 | 43 48 | |
| Rolled iron or steel plates not less than 30" in width and not less than $\frac{1}{4}$ " in thickness, n.o.p..... | 65,190.6 | 1,939,739 | 29 75 | | 17,264.3 | 501,177 | 29 03 | |
| Rolled iron or steel sheets, polished or not, No. 14 gauge and thinner, n.o.p..... | 51,776.5 | 2,545,347 | 49 16 | | 27,856.3 | 791,976 | 28 43 | |
| Rolls of chilled iron or steel..... | 194.5 | 11,457 | 58 90 | | 28,600.4 | 1,260,522 | 44 07 | |
| Rolled iron wire rods in the coil of iron or steel not over $\frac{1}{4}$ inch in diameter when imported by wire manufacturers for use in making wire in the coil in their own factories | | | | | 54.1 | 2,802 | 51 79 | |
| | | | | | 13,851.8 | 302,228 | 21 82 | |

| | | | | | | | |
|---|-------|-----------|-----------|--------|----------|-----------|--------|
| Rolled round rods in the coil of iron or steel for the manufacture of chains..... | " | ..... | ..... | ..... | 196.8 | 4,968 | 25 24 |
| Sad or smoothing hatters' and tailors' irons..... | \$ | ..... | 10,945 | ..... | ..... | 3,583 | ..... |
| Safes, doors for safes and vaults..... | " | ..... | 192,803 | ..... | ..... | 187,364 | ..... |
| Screws, iron and steel, commonly called wood screws n.o.p., including lag or coach screws, plated or not, and machine or other screws n.o.p..... | Gross | ..... | ..... | ..... | ..... | 45,970 | ..... |
| Scales, balances, weighing beams, and strength-testing machines of all kinds..... | Tons | ..... | 110,442 | ..... | ..... | 101,505 | ..... |
| Shafting, round, steel, in bars not exceeding 2½" diameter..... | " | ..... | 161,238 | 36 51 | 1,937.3 | 69,275 | 35 76 |
| Shafting, steel, turned compressed or polished..... | \$ | ..... | 15,074 | ..... | ..... | 13,121 | ..... |
| Sheets or plates of steel, cold rolled with sheared edges over 14 gauge, and not less than 14" wide for the manufacture of mower bars, hinges, typewriters, and sewing machines..... | Tons | ..... | ..... | ..... | ..... | ..... | ..... |
| Sheets, flat, of galvanized iron or steel..... | " | 742.1 | 30,294 | 40 82 | 321 | 13,862 | 43 18 |
| Sheets, iron or steel, corrugated, galvanized..... | " | 19,416.7 | 1,193,044 | 61 44 | 14,406.9 | 774,558 | 53 76 |
| Sheets, iron or steel corrugated, not galvanized..... | " | 203.2 | 14,975 | 73 70 | 72.5 | 3,939 | 54 33 |
| Skates, of all kinds, roller or other, and parts thereof..... | Pairs | 293.3 | 13,895 | 47 37 | 10.5 | 646 | 61 52 |
| Skip iron or steel, sheared or rolled in grooves, imported by manufacturers of wrought iron or steel pipe, for use exclusively in the manufacture of wrought iron or steel pipe in their own factories..... | Tons | ..... | 79,972 | ..... | ..... | 45,328 | ..... |
| Steel billets, n.o.p..... | " | 105,963.5 | 2,957,887 | 27 65 | 91,073.1 | 2,077,213 | 22 81 |
| Stoves, of all kinds, for coal, wood, oil, spirits or gas..... | \$ | 452.5 | 14,784 | 32 67 | 647.2 | 15,121 | 23 37 |
| Store urns of metal, and dovetails, chaplets, and hinge tubes of tin for use in the manufacture of stoves..... | " | ..... | 902,256 | ..... | ..... | 563,371 | ..... |
| Switches, frogs, crossings, and intersections for railways..... | Tons | ..... | 25,748 | ..... | ..... | 11,948 | ..... |
| Tubing— | " | ..... | 324,694 | ..... | ..... | 148,848 | ..... |
| Wrought or seamless tubing, plain or galvanized, threaded and coupled or not, over 10" in diameter, n.o.p..... | \$ | ..... | ..... | ..... | ..... | 185,311 | ..... |
| Wrought or seamless tubing, iron or steel, plain or galvanized, threaded and coupled, or not, over 4", but not exceeding 10" in diameter, n.o.p..... | " | ..... | 774,683 | ..... | ..... | 201,408 | ..... |
| Wrought or seamless tubing, iron or steel, plain or galvanized, threaded and coupled, or not, 4" and less in diameter, n.o.p..... | " | ..... | 419,294 | 113 91 | 211.8 | 164,147 | ..... |
| Seamless steel tubing, valued at not less than 3½ cents per lb..... | Tons | 724.6 | 82,538 | ..... | ..... | 30,314 | 143 13 |
| Rolled or drawn square tubing of iron or steel, adapted for use in the manufacture of agricultural implements..... | \$ | ..... | 14,895 | ..... | ..... | 6,036 | ..... |
| Iron or steel pipe or tubing, plain or galvanized, riveted, corrugated or otherwise specially manufactured, including lockjoint pipe, n.o.p..... | " | ..... | 1,572,658 | ..... | ..... | 469,598 | ..... |
| Iron or steel pipe, not butt or lap welded, and wire bound wooden pipe, not less than 30" internal diameter when for use exclusively in alluvial gold mining | " | ..... | 84 | ..... | ..... | 1,211 | ..... |
| Ware—Agate, granite, or enamelled iron or steel ware..... | " | ..... | 349,564 | ..... | ..... | 241,813 | ..... |
| Ware—Iron or steel hollow ware, plain black or coated n.o.p., and nickel and aluminium kitchen or household hollow ware..... | " | ..... | 224,552 | ..... | ..... | 161,443 | ..... |
| Wire bale ties..... | " | ..... | 5,943 | ..... | ..... | 8,436 | ..... |
| Wire bound wooden pipe, n.o.p..... | Tons | ..... | ..... | ..... | ..... | 1,624 | ..... |
| Wire cloth or woven wire and netting of iron and steel..... | " | 2,370.8 | 260,186 | 109 75 | 2,236.9 | 243,885 | 109 02 |
| Wire, crucible cast steel, valued at not less than 6 cents per lb..... | \$ | 122.9 | 38,087 | 314 79 | 10,996.9 | 34,390 | 31 27 |
| Wire screens, doors, and windows..... | " | ..... | 49,703 | ..... | ..... | 39,587 | ..... |
| Wire buckhorn strip fencing, woven wire fencing, and wire fencing, of iron and steel, n.o.p., not to include woven wire or netting made from wire, smaller than No. 14 gauge, not to include fencing or wire larger than No. 9 gauge..... | Tons | ..... | ..... | ..... | ..... | ..... | ..... |
| Wire, single or several, covered with cotton, linen, silk, rubber, or other material, including cable so covered..... | " | 938.9 | 74,774 | 79 64 | 945.4 | 74,182 | 78 47 |
| Wire of iron and steel all kinds, n.o.p..... | " | ..... | 1,009,921 | ..... | ..... | 401,590 | ..... |
| Wire rope, stranded or twisted wire clothes lines, picture or other twisted wire, and wire cables, n.o.p..... | " | 6,105.3 | 332,419 | 54 44 | 3,810.5 | 198,464 | 52 08 |
| Iron or steel nuts, rivets, or bolts with or without threads, nut bolt, and hinge blank, and T and strap hinges of all kinds, n.o.p..... | " | 4,339.3 | 642,905 | 148 16 | 2,670.3 | 432,099 | 161 81 |
| ..... | " | 3,792.2 | 324,320 | 85 52 | 2,147.8 | 169,929 | 79 12 |

Imports of Iron and Steel Goods Subject to Duty—Continued.

| | CALENDAR YEAR, 1913. | | | CALENDAR YEAR, 1914. | | |
|---|----------------------|-------------|-----------------|----------------------|------------|-----------------|
| | Quantity. | Value. | Value per unit. | Quantity. | Value. | Value per unit. |
| | | \$ | \$ cts. | | \$ | \$ cts. |
| Material. | | | | | | |
| Iron or steel scrap, wrought, being waste or refuse, including punchings, cuttings, and clippings of iron or steel plates or sheets having been in actual use: crop ends of tin plate bars, blooms, and rails, the same not having been in actual use. | 54,869.3 | 828,860 | 15 10 | 17,446.3 | 218,553 | 12 53 |
| Penknives, jack-knives, and pocket knives of all kinds. | | 103,792 | | | 81,715 | |
| Knives and forks of steel, plated or not, n.o.p. | | 342,946 | | | 210,260 | |
| All other cutlery, n.o.p. | | 875,316 | | | 539,548 | |
| Guns, rifles, including air guns and air rifles (not being toys), muskets, cannons, pistols, revolvers, or other firearms. | | 887,236 | | | 718,211 | |
| Bayonets, swords, fencing foils, and masks. | | 7,453 | | | 8,612 | |
| Needles of any material or kind, n.o.p. | | 140,685 | | | 117,408 | |
| Steel, chrome steel. | 323 | 29,657 | 91 82 | 123.9 | 11,201 | 90 40 |
| Steel plate, universal mill or rolled edge plates of steel over 12" wide, imported by manufacturers of bridges or of structural work, or for use in car construction. . . | 62,543.6 | 1,812,399 | 28 98 | 29,277.8 | 785,230 | 26 82 |
| Steel in bars or sheets to be used exclusively in the manufacture of shovels when imported by the manufacturers of shovels. | 2,985.8 | 88,421 | 29 61 | 653.7 | 17,082 | 26 13 |
| Rolled iron or steel, or cast steel in bars, bands, hoops, scroll, or strip, sheet, or plate of any size, thickness, or width, galvanized or coated with any material or not, and steel blanks for the manufacture of milling cutters, when of greater value than 3¢ cents per pound. | | | | | | |
| Flat steel, cold rolled, not over $\frac{3}{4}$ " thick, for the manufacture of cups and cones for ball bearings. | 9,907.9 | 1,197,321 | 120 84 | 6,172.4 | 779,716 | 126 32 |
| Steel wool. | 26.8 | 2,222 | 82 91 | | 19,747 | |
| Tools and implements— | | 4,995 | | | 4,729 | |
| Axles, cleavers, hatchets, wedges, sledges, hammers, crowbars, cant-dogs and track tools, picks, mattocks and eyes and poles for the same. | | 91,339 | | | 47,608 | |
| Saws. | 11,492 | 66,088 | 5 75 | 4,048 | 26,195 | 6 47 |
| Files and rasps, n.o.p. | | 155,005 | | | 83,110 | |
| Tools, hand or machine, of all kinds, n.o.p. | | 149,962 | | | 101,699 | |
| Knife blades or blanks, and table forks of iron and steel, in the rough, not handled, filed, ground, or otherwise manufactured. | | 985,772 | | | 621,039 | |
| Manufactures, articles or wares of iron and steel, or of which iron and steel (or either) are the component materials of chief value, n.o.p. | | 278 | | | 87 | |
| | | 11,206,350 | | | 7,542,806 | |
| | | 125,082,378 | | | 64,901,486 | |

Imports of Iron and Steel Goods Free of Duty.

| Material. | CALENDAR YEAR, 1913. | | | CALENDAR YEAR, 1914. | | |
|---|----------------------|-----------|-----------------|----------------------|-----------|-----------------|
| | Quantity. | Value. | Value per unit. | Quantity. | Value. | Value per unit. |
| Anchors for vessels..... | | | | | | |
| Chain coil, coil chain links including repair links and chain shackles of iron and steel 1½" in diameter and over..... | 330.4 | 27,282 | 82 57 | 425.5 | 30,943 | 72 72 |
| Chain, malleable sprocket or link belting..... | | | | 263.1 | 19,722 | 75 48 |
| Cream separators, and steel bowls for..... | | 303,463 | | | 139,663 | |
| Cream separators—materials which enter into the construction and form part of when imported by manufacturers of cream separators to be used in the manufacture thereof..... | | 429,741 | | | 455,337 | |
| Ferro-manganese and spiegeleisen containing over 15 per cent manganese..... | | 277,660 | | | 236,958 | |
| Gas buoys—The following articles and materials, when imported by manufacturers of automatic gas buoys and automatic gas beacons, for use in the manufacture of such buoys and beacons for the Government of Canada or for export, viz., iron or steel tubes over 16" in diameter; flanged and dished steel heads made from boiler plate, over 5 feet in diameter; hardened steel balls, not less than 3" in diameter; acetylene gas lanterns and parts thereof, and tobac bronze in bars or rods..... | | | | | 21,288 | |
| Gun barrels, in single tubes, forged, rough bored..... | | 7,035 | | | | |
| Iron or steel rods over 1½" in diameter for manufacturing of chain..... | 1,093.2 | 30,777 | 28 15 | 46.7 | 1,041 | 22 29 |
| Iron or steel, rolled round wire rods, in the coil, not over 1½" in diameter, when imported by wire manufacturers for use in making wire in the coil in their own factories..... | 79,608.4 | 1,962,235 | 24 65 | 51,201.2 | 1,165,401 | 22 76 |
| Boiler plate of iron or steel not less than 30" in width, and not less than ½" in thickness, for use exclusively in the manufacture of boilers..... | 24,348.2 | 804,582 | 33 04 | 7,528.8 | 212,669 | 28 25 |
| Flat galvanized iron or steel sheets..... | 34,768.4 | 2,135,558 | 61 42 | 23,203.8 | 1,372,577 | 59 15 |
| Rolled iron and steel, and cast steel in bars, band, hoop, scroll or strip, sheet or plate of any size, thickness, or width: galvanized or coated with any material or not, and steel blanks for the manufacture of milling cutters, when of greater value than 3½ cts. per lb..... | | | | | | |
| Rolled iron or steel sheets in strips, polished or not, 14 gauge and thinner, n.o.p..... | 4,813.8 | 798,549 | 165 89 | 2,452.3 | 408,754 | 166 68 |
| Rolled iron or steel, hoop, band, scroll, or strip, No. 14 gauge or thinner, galvanized or coated with other metal or not, n.o.p..... | 15,909.3 | 771,694 | 48 50 | 8,756.4 | 369,144 | 42 16 |
| Iron tubing, lacquered or brass covered, not over 2" in diameter, and brass trimmings, when imported by manufacturers of iron or brass bedsteads, for use exclusively for the manufacture of such articles in their own factories..... | 865.5 | 36,165 | 41 79 | 549.0 | 23,254 | 42 35 |
| Iron tubing, brass covered, not over 2" in diameter, in the rough where imported by manufacturers for use only in their own factories, in the manufacture of towel bars, bath tub rails and clothes carriers..... | | 285,798 | | | 147,961 | |
| Iron tubing, lacquered or brass covered, not over 2" in diameter, brass covered rods and brass trimmings, when imported by manufacturers of carriage rails, for use exclusively in the manufacture of such articles in their own factories..... | | 408 | | | 512 | |
| | | 7,015 | | | 1,813 | |

Imports of Iron and Steel Goods Free of Duty.—Continued.

| Material. | CALENDAR YEAR, 1913. | | | CALENDAR YEAR, 1914. | | |
|---|----------------------|-----------|-----------------|----------------------|----------|-----------------|
| | Quantity. | Value. | Value per unit. | Quantity. | Value. | Value per unit. |
| | | | | | | |
| Iron tubing for manufacture of extension rods for windows. . . . . | ..... | \$ 5,285 | ..... | ..... | \$ 3,761 | ..... |
| Iron or steel, beams, sheets or plates, ankles, knees, masts or parts thereof and cable chains for wooden, iron, steel or composite ships or vessels. | 20,397.6 | 651,892 | 31 96 | 14,884.3 | 405,908 | 27 27 |
| Iron and steel bands, strips or sheets, No. 14 gauge or thinner, coated, polished or not, and rolled iron or steel sections, not being ordinary square, flat or round bars, when imported by manufacturers of saddlery, hardware and hames, for use exclusively in the manufacture of such articles in their own factories. . . . . | ..... | ..... | ..... | ..... | 11,835 | ..... |
| Locomotive and car wheel tires of steel in the rough. | 11,801.5 | 625,636 | 53 01 | 6,713.0 | 316,904 | 47 21 |
| Manufactured articles of iron or steel or brass, which, at the time of their importation, are of a class or kind not manufactured in Canada, imported for use in the construction or equipment of ships or vessels. . . . . | ..... | 245,208 | ..... | ..... | 101,590 | ..... |
| Scrap iron and scrap steel, old, and fit only to be remanufactured, being part of or recovered from any vessel wrecked in waters subject to the jurisdiction of Canada. | 3.7 | 76 | 20 54 | 80.2 | 554 | 6 91 |
| Skelp iron or steel, sheared or rolled in grooves, not over 4½" wide, for the manufacture of rolled iron tubes not over 1½" in diameter. | 849.1 | 22,959 | 27 04 | 414.9 | 10,910 | 26 30 |
| Machinery. . . . . | ..... | ..... | ..... | ..... | ..... | ..... |
| Articles of metals as follows when for use exclusively in mining or metallurgical operations, viz: coal cutting machines, except percussion coal cutters, coal heading machines; coal augers; rotary coal drills; core drills; miners safety lamps and parts thereof, also accessories for cleaning, filling, and testing such lamps; electric or magnetic machines for separating or concentrating iron ores; furnaces for the smelting of copper, zinc, and nickel ores; converting apparatus for metallurgical processes in metals; copper plates, plated or not, machinery for extraction of precious metals by the chlorination or cyanide process; amalgam sates; automatic ore samplers; automatic feeders; retorts, mercury pumps, pyrometers; blast iron furnaces; amalgam cleaners; blast furnace blowing engines; wrought iron tubing, butt or lap welded; threaded, or in the form of pipe, over 4" in diameter, and integral parts of all machinery or in the reduction, separation, or refining of metals, rotary kilns, revolving roasters, and facies metal designed for roasting ore, mineral rock or clay; furnace slag trucks and slag pots of a class or kind not made in Canada; buddies, vanners, and slides tables adapted for use in gold mining. . . . . | ..... | 1,033,571 | ..... | ..... | 629,593 | ..... |
| Diamond drills, not to include motive power. . . . . | ..... | 70,549 | ..... | ..... | 48,617 | ..... |
| Appliances of iron and steel, of a class or kind not made in Canada, and machinery of floating dredges, when for use exclusively in alluvial gold mining. . . . . | ..... | 259,722 | ..... | ..... | 186,695 | ..... |
| Well-drilling, and apparatus of a class or kind not made in Canada for drilling for water, natural gas or oil, and for prospecting for minerals, not to include motive power. . . . . | ..... | 22,934 | ..... | ..... | 222,958 | ..... |

| | | | | | | | | | | |
|--|------|---------|-----------|----------|-------|---------|--|--|-----------|----------|
| Briquette making machines..... | 5 | | | | 3,708 | | | | 3,946 | |
| Newspaper printing presses, of not less value by retail than \$1,500 each, of a class or kind not made in Canada..... | No. | 122 | 513,348 | 4,207 77 | | 71 | | | 402,310 | 5,666 34 |
| Machinery of tools not manufactured in Canada up to the required standard necessary for any factory to be established in Canada for the manufacture of rifles for the Government of Canada..... | \$ | | 25,329 | | | | | | 131,900 | |
| All materials, or parts in the rough, unfinished, and screws, nuts, bands, and springs to be used in rifles to be manufactured at any such factory for the Government of Canada..... | " | | 60,656 | | | | | | 211,273 | |
| Machines, typesetting and typesetting and parts thereof, adapted for use in printing offices..... | " | | 504,837 | | | | | | 582,272 | |
| Machinery of every kind, and structural iron and steel for use in the construction and equipment of factories for the manufacture of sugar from beet root..... | " | | 19,449 | | | | | | 8,641 | |
| Machinery of a class or kind not made in Canada and parts thereof, for the manufacture of twines, twines, or for the preparation of flax fibre..... | " | | 56,265 | | | | | | 43,020 | |
| Machines, tractors, and other machinery adapted for tile drainage on farms, valued at retail at not more than \$3,000 each..... | No. | 138 | 54,681 | 396 24 | | 32 | | | 77,993 | 2,437 28 |
| Mould boards or shares, or plough plates and slides, or other places for agricultural implements, when put to shape from rolled plates of steel, but not moulded, punched, polished, or otherwise manufactured..... | Tons | 4,963.6 | 290,245 | 58 47 | | 2,033.2 | | | 116,335 | 57 22 |
| Sewing machine attaching ball bearings..... | Tons | | 39,789 | | | | | | 31,413 | |
| Steel for manufacturing ball bearings..... | Tons | | 1,996 | | | | | | 3,269 | |
| Steel balls adapted for use on bearings on machinery and vehicles..... | Tons | | | | | | | | | |
| Steel, rolled, for saws and straws, not tempered, or ground, nor further manufactured than cut to shape without indented edges..... | Tons | 1,309.9 | 187,929 | 143 46 | | 887.3 | | | 132,899 | 149 78 |
| Steel strips and flat steel wire when imported into Canada by manufacturers of buckthorn and plain strip fencing for use exclusively in their own factories in the manufacture thereof..... | " | 0.9 | 92 | 102 22 | | | | | | |
| Steel wire, Bessemer soft drawn spring of Nos. 10, 12, and 13 gauge, respectively, and homo steel spring wire of Nos. 11 and 12 gauge, respectively, when imported by manufacturers of wire mattresses, to be used exclusively in their own factories in the manufacture of such articles..... | " | 1,032 | 48,042 | 46 55 | | 569.5 | | | 27,672 | 48 59 |
| Steel, crucible sheet, 11 to 16 gauge, 21" to 18" wide for the manufacture of mower and reaper knives when imported by manufacturers thereof for use exclusively in the manufacture of such articles in their own factories..... | " | 593.8 | 46,491 | 78 29 | | 501.0 | | | 37,895 | 75 64 |
| Steel No. 20 gauge and thinner, but not thinner than 30 gauge, for the manufacture of corset steels, clock springs, and shoe shanks, imported by manufacturers of such articles for exclusive use in the manufacture of such articles in their own factories..... | " | 48.9 | 6,891 | 140 92 | | 44.2 | | | 4,134 | 93 53 |
| Steel wire, flat, of 16 gauge or thinner, imported by the manufacturers of crinoline, and corset wires and dress stays, for use exclusively in the manufacture of such articles in their own factories..... | " | 377.4 | 50,227 | 133 09 | | 347.5 | | | 55,215 | 158 89 |
| Steel, No. 12 gauge and thinner, but not thinner than No. 30 gauge, for the manufacture of buckle clasps, bed fasts, furniture casters, and ice-scoopers, imported by the manufacturers of such articles, for use exclusively in the manufacture of such articles in their own factories..... | " | 179.6 | 10,084 | 56 15 | | 104.2 | | | 5,159 | 49 51 |
| Steel No. 24 and 17 gauge, in the sheets 63" long and from 18" to 32" wide, when imported by the manufacturers of tubular bow sockets for use exclusively in the manufacture of such articles in their own factories..... | " | 88.5 | 3,566 | 40 29 | | 58.7 | | | 3,098 | 52 78 |
| Steel springs for the manufacture of surgical trusses when imported by manufacturers of surgical trusses for use exclusively in the manufacture thereof in their own factories..... | " | 0.6 | 264 | 440 00 | | 0.3 | | | 197 | 656 67 |
| Swedish rolled iron, and Swedish rolled steel nail rods, under half an inch in diameter, for the manufacture of horseshoe nails..... | " | 4,419.7 | 119,225 | 26 98 | | 1,575.3 | | | 72,841 | 46 24 |
| Tin plates and sheets..... | " | 58,031 | 3,954,615 | | | 50,791 | | | 3,151,385 | |
| Steel seamless tubing valued at not less than 3½ cents per pound..... | " | 114.5 | 21,092 | 184 21 | | 39 | | | 7,438 | 190 72 |

Imports of Iron and Steel Goods Free of Duty.—Concluded.

| Material. | CALENDAR YEAR, 1913. | | | CALENDAR YEAR, 1914. | | |
|--|----------------------|------------|-----------------|----------------------|------------|-----------------|
| | Quantity. | Value. | Value per unit. | Quantity. | Value. | Value per unit. |
| | | \$ | \$ cts. | | | \$ cts. |
| Steel rolled or drawn square tubing adapted for use in the manufacture of agricultural implements..... | ..... | 33,921 | ..... | ..... | 37,256 | ..... |
| Steel or iron tubes, rolled, not joined or welded, not more than 1½" in diameter, n.o.p. | ..... | 1,048,288 | ..... | ..... | 706,675 | ..... |
| Seamless steel, or wrought iron boiler tubes, including flues and corrugated tubes for marine boilers..... | ..... | 566,670 | ..... | ..... | 662,814 | ..... |
| Barbed fencing wire of iron or steel..... | 13,451.7 | 1,947 | 42 13 | 17,001.3 | 3,142 | 38 99 |
| Wire crucible cast steel, valued at not less than 6 cents per pound..... | 6.5 | 1,387,528 | 299 54 | 12 | 3,622 | 261 83 |
| Wire, curved or not, galvanized iron or steel, Nos. 9, 12, and 13 gauge..... | 38,282.8 | 13,226 | 36 24 | 35,347.9 | 1,223,600 | 34 62 |
| Wire rope for use exclusively for rigging of ships and vessels..... | 119.2 | ..... | 110 95 | 39.5 | 4,616 | 116 86 |
| Wire, steel, valued at not less than 2½ cents per pound when imported by manufacturers of rope for use exclusively in the manufacture of rope..... | 3,296.6 | 258,399 | 78 38 | 3,026.1 | 237,299 | 78 42 |
| Total..... | ..... | 20,144,594 | ..... | ..... | 14,860,776 | ..... |

Imports of Iron and Steel into Canada from the United States.*

| Material. | TWELVE MONTHS ENDING JUNE, 1912. | | | | TWELVE MONTHS ENDING JUNE, 1913. | | | | TWELVE MONTHS ENDING JUNE, 1914. | | | |
|--|-------------------------------------|------------|----------|--|-------------------------------------|------------|----------|--|-------------------------------------|------------|----------|--|
| | Quantity. | Value. | Average. | | Quantity. | Value. | Average. | | Quantity. | Value. | Average. | |
| | | \$ | \$ cts. | | | \$ | \$ cts. | | | \$ | \$ cts. | |
| Bar iron..... | 9,591.9 | 308,745 | 32 19 | | 11,773.8 | 429,181 | 36 45 | | 6,544.2 | 308,248 | 47 10 | |
| Bars or rods of steel— | | | | | | | | | | | | |
| Wire rods..... | 53,582.9 | 1,412,910 | 26 37 | | 82,474.3 | 2,134,198 | 25 88 | | 63,108.3 | 1,617,939 | 25 64 | |
| All other..... | 95,215.9 | 2,859,441 | 30 03 | | 124,761.6 | 3,921,471 | 31 43 | | 92,791.8 | 3,019,274 | 32 54 | |
| Billets, ingots, and blooms of steel..... | 60,008.5 | 1,200,711 | 20 01 | | 87,968.2 | 1,865,120 | 21 20 | | 24,243.5 | 487,089 | 20 09 | |
| Bolts, nuts, rivets and washers..... | (a) | ..... | ..... |  | 13,220.2 | 218,805 | 67 95 | | 2,603.4 | 181,072 | 69 55 | |
| Hoop, band and scroll..... | 7,206.2 | 281,946 | 39 13 | | 9,436.3 | 376,561 | 39 91 | | 9,157.1 | 376,999 | 41 17 | |
| Horsehoes..... | (a) | ..... | ..... |  | 271.1 | 24,894 | 91 83 | | 248.8 | 22,941 | 92 21 | |
| Nails and spikes— | | | | | | | | | | | | |
| Cut..... | 5,419.6 | 159,215 | 29 38 | | 8.3 | 488 | 58 80 | | 21.3 | 932 | 43 76 | |
| Railroad spikes..... | (a) | ..... | ..... |  | 6,218.4 | 224,193 | 36 05 | | 3,543.2 | 121,999 | 34 43 | |
| Wire..... | 1,245.9 | 52,498 | 42 14 | | 2,262.4 | 106,693 | 47 16 | | 1,342.3 | 62,046 | 46 22 | |
| All other, including tacks..... | 3,113.1 | 176,371 | 56 65 | | 628.0 | 48,063 | 76 53 | | 34.164 | 34,164 | 85 80 | |
| Pig-iron..... | 157,480.9 | 1,979,355 | 12 57 | | 248,846.1 | 3,124,550 | 12 56 | | 140,510.7 | 1,782,862 | 12 69 | |
| Pipes and fittings..... | 76,248.5 | 3,578,892 | 46 94 | | 78,618.7 | 4,175,057 | 53 11 | | 52,674.8 | 2,732,573 | 51 88 | |
| Radiators and cast-iron heating boilers..... | 3,819.9 | 250,552 | 65 59 | | 8,989.5 | 653,182 | 72 66 | | 5,722.7 | 401,980 | 70 24 | |
| Rails for railways..... | 132,973.1 | 3,369,894 | 25 34 | | 155,051.7 | 3,980,657 | 25 67 | | 129,545.9 | 3,415,167 | 26 36 | |
| Scrap and old, fit only for remanufacture..... | 64,365.3 | 737,167 | 11 45 | | 84,523.0 | 1,032,971 | 12 22 | | 49,570.0 | 577,917 | 11 66 | |
| Sheets and plates— | | | | | | | | | | | | |
| Iron, galvanized..... | 43,790.6 | 2,030,648 | 46 37 | | 41,505.6 | 2,428,687 | 58 51 | | 26,827.5 | 1,595,003 | 59 45 | |
| Iron, all other..... | ..... | ..... | ..... |  | 15,568.1 | 692,434 | 44 48 | | 9,763.2 | 434,525 | 44 51 | |
| Steel, plates..... | 209,207.2 | 7,457,232 | 35.65 | | 220,528.7 | 6,706,433 | 30 41 | | 141,842.1 | 4,245,763 | 29 93 | |
| Steel, sheets..... | ..... | ..... | ..... |  | 120,309.0 | 3,916,764 | 32 56 | | 97,516.2 | 3,014,796 | 30 92 | |
| Structural iron and steel..... | 144,721.9 | 5,150,353 | 35 59 | | 269,250.2 | 9,242,288 | 34 33 | | 224,666.4 | 6,990,022 | 31 01 | |
| Tin plates,terne plates, and taggers tin..... | 42,336.8 | 2,985,065 | 70 51 | | 58,289.2 | 4,065,672 | 69 75 | | 36,582.3 | 2,513,867 | 68 72 | |
| Wire and manufactures of— | | | | | | | | | | | | |
| Wire, barbed..... | 21,497.9 | 895,725 | 41 67 | | 16,094.8 | 656,185 | 40 77 | | 12,688.9 | 508,337 | 40 06 | |
| " all other..... | 43,638.2 | 1,750,586 | 40 12 | | 49,318.8 | 1,912,069 | 38 77 | | 37,436.5 | 1,476,297 | 39 43 | |
| Builders' hardware and tools— | 1,175,464.3 | 36,637,305 | 31 17 | | 1,695,916.0 | 51,936,616 | 30 62 | | 1,169,349.3 | 35,921,812 | 30 72 | |
| Locks..... | ..... | ..... | ..... |  | ..... | 479,985 | ..... |  | ..... | 303,601 | ..... |  |
| Hinges, and other builders' hardware..... | ..... | 1,762,066 | ..... |  | ..... | 1,712,768 | ..... |  | ..... | 1,365,987 | ..... |  |
| Car wheels..... | 3,749 | 36,021 | 9 61 | | 14,640 | 107,300 | 7 33 | | 11,696 | 108,174 | 9 25 | |
| Castings, not elsewhere specified..... | ..... | 1,312,729 | ..... |  | ..... | 1,656,680 | ..... |  | ..... | 1,626,211 | ..... |  |

Imports of Iron and Steel into Canada from the United States.—Continued.

| Material. | TWELVE MONTHS ENDING JUNE, 1912. | | | TWELVE MONTHS ENDING JUNE, 1913. | | | TWELVE MONTHS ENDING JUNE, 1914. | | |
|--|-------------------------------------|-------------|----------|-------------------------------------|-----------|----------|-------------------------------------|-----------|----------|
| | Quantity. | Value. | Average. | Quantity. | Value. | Average. | Quantity. | Value. | Average. |
| Cutlery— | | \$ | \$ cts. | | \$ | \$ cts. | | \$ | \$ cts. |
| Razors..... | ..... | (a) 27,841 | ..... | ..... | 46,962 | ..... | ..... | 39,099 | ..... |
| Table..... | ..... | ..... | ..... | ..... | 24,409 | ..... | ..... | 31,870 | ..... |
| All other..... | ..... | 175,666 | ..... | ..... | 132,951 | ..... | ..... | 102,870 | ..... |
| Enamelled— | | (a)..... | ..... | 2,058 | 38,415 | 18 67 | 1,718 | 25,090 | 14 60 |
| Baths, tubs..... | ..... | (a)..... | ..... | ..... | 156,987 | ..... | ..... | 158,889 | ..... |
| Lavatories and sinks..... | ..... | (a)..... | ..... | ..... | 163,394 | ..... | ..... | 140,664 | ..... |
| All other..... | ..... | 503,710 | ..... | ..... | 679,784 | ..... | ..... | 529,528 | ..... |
| Firearms..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... |
| Machinery, machines and parts of— | | | | | | | | | |
| Adding machines..... | ..... | 288,617 | ..... | 1,551 | 331,477 | 213 72 | 2,472 | 405,125 | 163 89 |
| Aircompressing machinery..... | ..... | (a)..... | ..... | ..... | 333,448 | ..... | ..... | 224,278 | ..... |
| Brewers' machinery..... | ..... | 112,627 | ..... | ..... | 311,638 | ..... | ..... | 189,008 | ..... |
| Cash registers..... | ..... | 81,234 | 79 18 | 1,894 | 124,133 | 65 54 | 848 | 160,143 | 106 30 |
| Cream separators..... | 1,026 | ..... | ..... | 8,980 | 344,424 | 38 35 | 7,518 | 287,242 | 38 21 |
| Electric machinery..... | ..... | (a) 869,761 | ..... | ..... | ..... | ..... | ..... | ..... | ..... |
| Elevators and elevator machinery..... | ..... | (a)..... | ..... | ..... | 433,725 | ..... | ..... | 468,800 | ..... |
| Laundry machinery..... | ..... | 167,735 | ..... | ..... | 232,726 | ..... | ..... | 119,491 | ..... |
| Lawn mowers..... | ..... | (a)..... | ..... | ..... | 51,379 | ..... | ..... | 49,502 | ..... |
| Metal working machinery (including metal working machine tools)..... | ..... | 1,362,326 | ..... | ..... | 2,376,270 | ..... | ..... | 1,199,356 | ..... |
| Milling machinery (flour and grist)..... | ..... | (a)..... | ..... | ..... | 423,227 | ..... | ..... | 1,197,029 | ..... |
| Mining machinery..... | ..... | 1,224,011 | ..... | ..... | 2,223,659 | ..... | ..... | 1,210,884 | ..... |
| Paper-mill machinery..... | ..... | (a)..... | ..... | ..... | 930,196 | ..... | ..... | 317,317 | ..... |
| Printing presses and parts of..... | ..... | 1,265,657 | ..... | ..... | 920,522 | ..... | ..... | 770,417 | ..... |
| Pumps and pumping machinery..... | ..... | 701,144 | ..... | ..... | 878,431 | ..... | ..... | 723,447 | ..... |
| Refrigerating machinery, ice-making machinery, etc..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... |
| Sewing machines and parts of..... | ..... | 170,564 | ..... | ..... | 289,777 | ..... | ..... | 199,540 | ..... |
| Shoe machinery..... | ..... | 484,687 | ..... | ..... | 527,726 | ..... | ..... | 412,422 | ..... |
| Steam and other power engines | ..... | 274,388 | ..... | ..... | 300,356 | ..... | ..... | 192,035 | ..... |
| and parts of— | | | | | | | | | |
| Electric locomotives..... | 8 | 46,745 | 5,843 13 | 21 | 146,458 | 6,974 19 | 12 | 27,623 | 2,301 92 |
| Gas, stationary..... | 766 | 130,713 | 174 64 | 991 | 149,648 | 151 01 | 1,097 | 143,546 | 130 85 |
| Gasoline automobile..... | 6,844 | 769,195 | 112 39 | 8,906 | 753,702 | 84 63 | 353 | 71,070 | 201 33 |
| " marine..... | 1,842 | 305,842 | 166 04 | 1,771 | 385,134 | 217 47 | 1,747 | 302,391 | 173 09 |
| " stationary..... | 5,096 | 754,570 | 148 07 | 9,690 | 1,269,428 | 130 88 | 9,885 | 1,009,443 | 102 12 |
| " traction..... | 1,710 | 3,166,507 | 1,851 76 | 2,013 | 3,675,691 | 1,825 98 | 382 | 637,162 | 1,667 96 |

| | | | | | | | | | |
|--|-------|------------|----------|--------|-------------|----------|--------|------------|----------|
| Steam, locomotives..... | 107 | 472,046 | 4,411 64 | 160 | 1,182,993 | 7,393 71 | 86 | 502,253 | 5,840 15 |
| " marine..... | 3 | 18,000 | 6,000 00 | 79 | 26,838 | 339 72 | 35 | 100,887 | 2,881 63 |
| " stationary..... | 245 | 247,729 | 1,011 14 | 360 | 260,042 | 722 34 | 236 | 189,786 | 2,804 18 |
| " traction..... | 259 | 478,526 | 1,847 59 | 540 | 1,058,600 | 1,960 37 | 228 | 388,477 | 1,703 88 |
| Engines, all other..... | | (a) | | 1,450 | 871,371 | 600 95 | 1,336 | 444,255 | 332 58 |
| All other engines and parts of .. | | 1,910,440 | | | 1,436,820 | | | 988,735 | |
| Sugar-mill machinery..... | | 24,431 | | | 35,761 | | | 186,567 | |
| Textile machinery..... | | (a) | | | 858,568 | | | 670,799 | |
| Typesetting machines, linotype and others..... | | (a) | | | 394,635 | | | 506,459 | |
| Typewriting machines and parts of | | 944,600 | | | 954,904 | | | 602,792 | |
| Windmills and parts of..... | | 71,044 | | | 59,720 | | | 72,099 | |
| Woodworking machinery, sawmill machinery..... | | 382,752 | | | 439,173 | | | 221,283 | |
| Woodworking machinery, all other | | 375,446 | | | 477,345 | | | 511,400 | |
| All other..... | | 10,627,184 | | | 10,872,249 | | | 10,095,534 | |
| Railway track material (except rails and spikes) such as switches, frogs, fish-plates, splice-bars, etc..... | No. | (a) | | | 732,617 | | | 793,134 | |
| Safes..... | 4,320 | 217,860 | 50 43 | 3,403 | 208,277 | 61 20 | 3,070 | 135,612 | 44 17 |
| Scales, and balances..... | | 159,851 | | | 158,349 | | | 134,191 | |
| Stoves, ranges and parts of..... | | 1,041,935 | | | 1,314,725 | | | 975,460 | |
| Tools not elsewhere specified— | | (a) | | | | | | | |
| Axes..... | No. | | | 83,122 | 44,526 | 54 | 70,548 | 38,493 | 55 |
| Hammers and hatchets..... | | (a) | | | 74,947 | | | 38,979 | |
| Saws..... | | 267,810 | | | 346,887 | | | 234,721 | |
| Shovels and spades..... | | (a) | | | 23,099 | | | 14,087 | |
| All other..... | | 1,686,924 | | | 1,866,713 | | | 1,371,832 | |
| Wire manufactures—woven wire fencing | | (a) | | | 114,395 | | | 93,370 | |
| Wire manufactures—all others..... | | (a) | | | 430,288 | | | 365,327 | |
| All other manufactures of steel..... | | 10,100,055 | | | 7,877,122 | | | 7,375,163 | |
| Total value..... | | 46,020,989 | | | 54,673,774 | | | 40,731,318 | |
| | | 82,658,294 | | | 106,610,390 | | | 76,653,130 | |

*Compiled from Commerce and Navigation of the United States, Washington, D. C. (a) Not separately stated in 1912.

LEAD.

The production of lead in Canada in 1914 amounted to 36,337,765 pounds, valued at \$1,627,568 as compared with 37,662,703 pounds valued at \$1,754,705 in 1913, being a decrease in production of 3·5 per cent.

The statistics of lead production since 1909 as given in the accompanying table represent the quantity of refined lead produced in Canada from domestic ores, together with a small quantity of lead contained in lead ores exported. The production has been mainly from British Columbia with occasionally small amounts from Ontario. During 1914 there were no shipments from Ontario but there was a small production in the Yukon.

Annual Production of Lead.

| Calendar Year. | Lbs. | Price per lb. | Value. | Calendar Year. | Lbs. | Price per lb. | Value. |
|----------------|------------|---------------|-----------|----------------|------------|---------------|-----------|
| | | Cts. | \$ | | | Cts. | \$ |
| 1887..... | 204,800 | 5·400 | 9,216 | 1901..... | 51,900,958 | 4·334 | 2,249,387 |
| 1888..... | 674,500 | 4·420 | 29,812 | 1902..... | 22,956,381 | 4·069 | 934,095 |
| 1889..... | 165,100 | 3·930 | 6,488 | 1903..... | 18,139,283 | 4·237 | 768,562 |
| 1890..... | 105,000 | 4·480 | 4,704 | 1904..... | 37,531,244 | 4·309 | 1,617,221 |
| 1891..... | 88,665 | 4·350 | 3,857 | 1905..... | 56,864,915 | 4·707 | 2,676,632 |
| 1892..... | 808,420 | 4·090 | 33,064 | 1906..... | 54,608,217 | 5·657 | 3,089,187 |
| 1893..... | 2,135,023 | 3·730 | 79,636 | 1907..... | 47,738,703 | 5·325 | 2,542,086 |
| 1894..... | 5,703,222 | 3·290 | 187,636 | 1908..... | 43,195,733 | 4·200 | 1,814,221 |
| 1895..... | 16,461,794 | 3·230 | 531,716 | 1909..... | 45,857,424 | *3·690 | 1,692,139 |
| 1896..... | 24,199,977 | 2·980 | 721,159 | 1910..... | 32,987,508 | *3·687 | 1,216,249 |
| 1897..... | 39,018,219 | 3·580 | 1,396,853 | 1911..... | 23,784,969 | *3·480 | 827,717 |
| 1898..... | 31,915,319 | 3·780 | 1,206,399 | 1912..... | 35,763,476 | †4·467 | 1,597,554 |
| 1899..... | 21,862,436 | 4·470 | 977,250 | 1913..... | 37,662,703 | †4·659 | 1,754,705 |
| 1900..... | 63,169,821 | 4·370 | 2,760,521 | 1914..... | 36,337,765 | †4·479 | 1,627,568 |

*In 1909 and 1910, average prices at Toronto as quoted by *Hardware and Metal*; in previous years average prices at New York, as quoted by *Engineering and Mining Journal*.

†Average price at Montreal. Quotations furnished by Messrs. Thos. Robertson & Co., Montreal, Que.

Previous to 1904 lead ores mined in Canada were either exported as ore or smelted in Canadian furnaces and exported in the form of base bullion to be refined abroad. A lead refinery employing the Betts electrolytic process is in operation at Trail, B.C., at the smelter there, treating the base bullion produced by the lead blast furnaces.

The North American Smelting Company erected a plant at Kingston, Ontario, which started operations during the latter part of 1912, treating scrap and lead dross as well as ores from the United States, British Columbia, and Ontario. This plant closed down November 1, 1913, and did not resume operations during 1914.

The production of refined lead, including pig lead and lead pipe, has been as follows:—

| Year. | Refined lead produced. | Year. | Refined lead produced. |
|-----------|------------------------|-----------|------------------------|
| | Lbs. | | Lbs. |
| 1904..... | 7,519,440 | 1910..... | 32,987,508 |
| 1905..... | 15,804,509 | 1911..... | 23,525,050 |
| 1906..... | 20,471,314 | 1912..... | 37,008,490 |
| 1907..... | 26,607,461 | 1913..... | 39,663,766 |
| 1908..... | 36,549,274 | 1914..... | 36,443,706 |
| 1909..... | 41,883,614 | | |

A small tonnage of lead ores from British Columbia and the Yukon was treated at the Tacoma Smelting Works, Tacoma, Washington, during 1914.

During the past two or three years there has been a very wide divergence between the record of lead recovery and the statements of lead contained in ores shipped from the mines. While the difference is due in part to smelter losses there was also during 1912 and 1913 especially, a considerable accumulation of lead ores at the Trail smelter.

The shipments of lead ores from mines and the metallic contents thereof have been, during the past three years, as follows:—

| Year. | Lead ores shipped. | Lead contents. | Silver contents. |
|-----------|--------------------|----------------|------------------|
| | Tons. | Pounds. | Ounces. |
| 1912..... | 59,814 | 45,896,537 | 2,366,294 |
| 1913..... | 85,978 | 53,807,570 | 2,564,155 |
| 1914..... | 70,207 | 50,537,130 | 2,501,820 |

Prices:—The average price for soft lead in 1914 on the London market was £18 13s. 9d. per long ton, as compared with £18 6s. 2d. in 1913, and £17 15s. 11d. in 1912.

The price of lead at Montreal, the main Canadian market, was higher in 1914 than the New York and London values.

The Toronto price in winter is about the same as that at Montreal, but the latter falls during the period of summer freight rates, about 10 cents per 100 pounds below the former.

The average prices of lead in Montreal in 1914 was 4.479 cents per pound, against 4.146 in London and 3.862 in New York.

The yearly average prices of lead in Montreal, London, and New York, for the last few years, is given in the following table:—

Yearly Average price of Lead in Montreal, London, New York, and St. Louis.

(Values in cents per pound.)

| | 1908. | 1909. | 1910. | 1911. | 1912. | 1913. | 1914. |
|----------------|-------|-------|-------|-------|-------|-------|-------|
| Montreal..... | 3.364 | 3.268 | 3.246 | 3.480 | 4.467 | 4.659 | 4.479 |
| London..... | 2.897 | 2.803 | 2.775 | 2.992 | 3.921 | 4.072 | 4.146 |
| New York..... | 4.200 | 4.273 | 4.446 | 4.420 | 4.471 | 4.370 | 3.862 |
| St. Louis..... | | 4.133 | 4.312 | 4.286 | 4.360 | 4.238 | 3.737 |

The monthly and yearly average prices for lead in Montreal for the past six years are given in the following table:—

Monthly Average Prices of Pig Lead at Montreal.*

(Value in cents per pound.)

| Month. | 1909. | 1910. | 1911. | 1912. | 1913. | 1914. |
|----------------|-------|-------|-------|-------|-------|-------|
| January..... | 3.35 | 3.48 | 3.31 | 3.93 | 4.32 | 4.78 |
| February..... | 3.38 | 3.40 | 3.32 | 3.97 | 4.18 | 4.73 |
| March..... | 3.42 | 3.34 | 3.34 | 4.03 | 4.05 | 4.57 |
| April..... | 3.35 | 3.21 | 3.26 | 4.10 | 4.42 | 4.41 |
| May..... | 3.26 | 3.13 | 3.20 | 4.08 | 4.66 | 4.54 |
| June..... | 3.23 | 3.15 | 3.27 | 4.34 | 4.98 | 4.55 |
| July..... | 3.12 | 3.13 | 3.33 | 4.57 | 4.93 | 4.49 |
| August..... | 3.08 | 3.11 | 3.45 | 4.84 | 5.02 | 4.48 |
| September..... | 3.14 | 3.11 | 3.63 | 5.47 | 5.02 | 4.42 |
| October..... | 3.26 | 3.23 | 3.77 | 5.07 | 4.99 | 4.07 |
| November..... | 3.28 | 3.31 | 3.93 | 4.53 | 4.82 | 4.29 |
| December..... | 3.34 | 3.35 | 3.95 | 4.55 | 4.52 | 4.41 |
| Average..... | 3.268 | 3.246 | 3.480 | 4.467 | 4.659 | 4.479 |

*Producers' prices for car-load quantities ex cars Montreal as furnished by Messrs. Thos. Robertson & Co., Ltd., of Montreal.

The average prices of lead in New York as quoted by the "Engineering and Mining Journal," are shown in the following table:—

Monthly Average Prices of Lead in New York.

(Values in cents per pound.)

| Month. | 1904. | 1905. | 1906. | 1907. | 1908. | 1909. | 1910. | 1911. | 1912. | 1913. | 1914. |
|----------------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| January..... | 4.347 | 4.552 | 5.600 | 6.000 | 3.691 | 4.175 | 4.700 | 4.483 | 4.435 | 4.321 | 4.111 |
| February..... | 4.375 | 4.450 | 5.464 | 6.000 | 3.725 | 4.018 | 4.613 | 4.440 | 4.026 | 4.325 | 4.048 |
| March..... | 4.475 | 4.470 | 5.350 | 6.000 | 3.838 | 3.986 | 4.459 | 4.394 | 4.073 | 4.327 | 3.970 |
| April..... | 4.475 | 4.500 | 5.404 | 6.000 | 3.993 | 4.168 | 4.376 | 4.412 | 4.200 | 4.381 | 3.810 |
| May..... | 4.423 | 4.500 | 5.685 | 6.000 | 4.253 | 4.287 | 4.315 | 4.373 | 4.194 | 4.342 | 3.900 |
| June..... | 4.196 | 4.500 | 5.750 | 5.760 | 4.466 | 4.350 | 4.343 | 4.435 | 4.392 | 4.325 | 3.900 |
| July..... | 4.192 | 4.524 | 5.750 | 5.288 | 4.447 | 4.321 | 4.404 | 4.499 | 4.720 | 4.353 | 3.891 |
| August..... | 4.111 | 4.665 | 5.750 | 5.250 | 4.580 | 4.363 | 4.400 | 4.500 | 4.569 | 4.624 | 3.875 |
| September..... | 4.200 | 4.850 | 5.750 | 4.813 | 4.515 | 4.342 | 4.400 | 4.485 | 5.048 | 4.698 | 3.828 |
| October..... | 4.200 | 4.850 | 5.750 | 4.750 | 4.351 | 4.341 | 4.400 | 4.265 | 5.071 | 4.402 | 3.528 |
| November..... | 4.200 | 5.200 | 5.750 | 4.376 | 4.330 | 4.370 | 4.442 | 4.298 | 4.615 | 4.293 | 3.683 |
| December..... | 4.600 | 5.422 | 5.900 | 3.658 | 4.213 | 4.560 | 4.500 | 4.450 | 4.303 | 4.047 | 3.800 |
| Average..... | 4.309 | 4.707 | 5.657 | 5.325 | 4.200 | 4.273 | 4.446 | 4.420 | 4.471 | 4.370 | 3.862 |

The average monthly prices of soft lead in London, England, as published by Julius Matton, of London, were, from 1905 to 1914 inclusive, as follows:—

Average Monthly Prices of Lead in London.

(£ per Long Ton.)

| Month. | 1905. | | | 1906. | | | 1907. | | | 1908. | | | 1909. | | |
|---------------------|-------|----|----|-------|----|----|-------|----|----|-------|----|-----|-------|----|-----|
| | £ | s. | d. | £ | s. | d. | £ | s. | d. | £ | s. | d. | £ | s. | d. |
| January..... | 12 | 17 | 6 | 16 | 17 | 6 | 19 | 16 | 0 | 14 | 10 | 6 | 13 | 3 | 6 |
| February..... | 12 | 9 | 3 | 16 | 0 | 4 | 19 | 11 | 8 | 14 | 5 | 6 | 13 | 5 | 5 |
| March..... | 12 | 5 | 11 | 15 | 17 | 9 | 19 | 14 | 6 | 14 | 1 | 4 | 13 | 8 | 8½ |
| April..... | 12 | 13 | 2 | 15 | 16 | 6 | 19 | 16 | 7 | 13 | 13 | 10 | 13 | 7 | 0 |
| May..... | 12 | 15 | 3 | 16 | 13 | 6 | 19 | 17 | 7 | 13 | 2 | 7 | 13 | 5 | 3 |
| June..... | 13 | 0 | 0 | 16 | 15 | 6 | 20 | 6 | 0 | 12 | 15 | 7 | 13 | 2 | 4 |
| July..... | 13 | 12 | 2 | 16 | 11 | 7 | 20 | 8 | 2 | 12 | 19 | 6 | 12 | 13 | 3 |
| August..... | 13 | 19 | 2 | 17 | 1 | 3 | 19 | 0 | 3 | 13 | 9 | 10½ | 12 | 10 | 6 |
| September..... | 13 | 19 | 0 | 18 | 4 | 4 | 19 | 17 | 6 | 13 | 3 | 6 | 12 | 15 | 3 |
| October..... | 14 | 13 | 7 | 19 | 7 | 9 | 18 | 13 | 0 | 13 | 7 | 3 | 13 | 4 | 4 |
| November..... | 15 | 6 | 9 | 19 | 5 | 6 | 17 | 4 | 11 | 13 | 12 | 2 | 13 | 1 | 4½ |
| December..... | 17 | 1 | 0 | 19 | 12 | 6 | 14 | 9 | 4 | 13 | 3 | 6 | 13 | 2 | 11½ |
| Yearly average..... | 13 | 14 | 5 | 17 | 7 | 0 | 19 | 1 | 10 | 13 | 10 | 5 | 13 | 1 | 8 |

| Month. | 1910. | | | 1911. | | | 1912. | | | 1913. | | | 1914. | | |
|---------------------|-------|----|----|-------|-----|----|-------|----|----|-------|----|----|-------|----|----|
| | £ | s. | d. | £ | s. | d. | £ | s. | d. | £ | s. | d. | £ | s. | d. |
| January..... | 13 | 3 | 11 | 13 | 0 | 8 | 15 | 11 | 3 | 17 | 1 | 11 | 18 | 19 | 10 |
| February..... | 13 | 7 | 3 | 13 | 1 | 11 | 15 | 13 | 9 | 16 | 8 | 5 | 19 | 2 | 8 |
| March..... | 13 | 2 | 9 | 13 | 2 | 11 | 15 | 19 | 8 | 15 | 19 | 8 | 19 | 2 | 3 |
| April..... | 12 | 13 | 9 | 12 | 18 | 5 | 16 | 6 | 6 | 17 | 8 | 10 | 17 | 19 | 8 |
| May..... | 12 | 11 | 8 | 12 | 19½ | 2 | 16 | 10 | 2 | 18 | 14 | 3 | 18 | 4 | 8 |
| June..... | 12 | 13 | 9 | 13 | 5 | 5 | 17 | 11 | 8 | 19 | 10 | 8 | 18 | 13 | 11 |
| July..... | 12 | 11 | 8 | 13 | 10 | 11 | 18 | 8 | 9 | 19 | 7 | 10 | 18 | 8 | 6 |
| August..... | 12 | 10 | 10 | 14 | 1 | 4 | 19 | 5 | 8 | 19 | 15 | 8 | 20 | 9 | 9 |
| September..... | 12 | 12 | 6 | 14 | 15 | 1 | 21 | 9 | 0 | 19 | 14 | 10 | 18 | 16 | 3 |
| October..... | 13 | 2 | 0 | 15 | 6 | 1 | 20 | 8 | 0 | 19 | 9 | 5 | 17 | 9 | 8 |
| November..... | 13 | 4 | 6 | 15 | 15 | 5 | 18 | 4 | 7 | 18 | 13 | 9 | 17 | 19 | 9 |
| December..... | 13 | 3 | 9 | 15 | 13 | 4 | 18 | 1 | 6 | 17 | 8 | 8 | 18 | 18 | 6 |
| Yearly average..... | 12 | 19 | 0 | 13 | 19 | 3 | 17 | 15 | 11 | 18 | 6 | 2 | 18 | 13 | 9 |

The exports of lead contained in ore and concentrates during the calendar year 1914 were 246,100 pounds valued at \$2,681, against 329,960 pounds valued at \$9,136 in 1913.

The exports of pig lead in 1914 amounted to 510,573 pounds valued at \$19,507. The following tables give the details of exports from 1909 to 1914 and the total exports of lead since 1873 to 1914:—

Exports of Lead, 1909 to 1914.

| | LEAD IN ORE, CONCENTRATES, ETC. | | PIG LEAD. | |
|-------------------------|------------------------------------|---------|------------|---------|
| | Lbs. | Value. | Lbs. | Value. |
| | | \$ | | \$ |
| 1909. | | | | |
| To United States..... | 6,096,852 | 126,478 | 280 | 8 |
| To other countries..... | 129,216 | 6,100 | 11,301,680 | 361,056 |
| Total..... | 6,226,068 | 132,578 | 11,301,960 | 361,064 |
| 1910. | | | | |
| To United States..... | 46,800 | 1,308 | 59,605 | 2,295 |
| To other countries..... | | | 7,652,648 | 245,879 |
| Total..... | 46,800 | 1,308 | 7,712,253 | 248,174 |
| 1911. | | | | |
| To United States..... | 65,100 | 1,826 | 71,961 | 2,806 |
| To other countries..... | | | | |
| Total..... | 65,100 | 1,826 | 71,961 | 2,806 |
| 1912. | | | | |
| To United States..... | 299,240 | 8,193 | | |
| To other countries..... | | | | |
| Total..... | 299,240 | 8,193 | | |
| 1913. | | | | |
| To United States..... | 329,960 | 9,136 | | |
| To other countries..... | | | | |
| Total..... | 329,960 | 9,136 | | |
| 1914. | | | | |
| To United States..... | 246,100 | 2,681 | 510,573 | 19,507 |
| To other countries..... | | | | |
| Total..... | 246,100 | 2,681 | 510,573 | 19,507 |

The annual exports of lead since 1873 are shown in the following table:—

Exports of Lead, 1873 to 1914.

| Calendar Year. | Lbs. | Value. | Calendar Year. | Lbs. | Value. |
|----------------|------|--------|----------------|------------|-----------|
| | | \$ | | | \$ |
| 1873..... | | 1,993 | 1894..... | 5,792,700 | 144,509 |
| 1874..... | | 127 | 1895..... | 23,075,892 | 435,071 |
| 1875..... | | 7,510 | 1896..... | 26,480,320 | 462,095 |
| 1876..... | | 66 | 1897..... | 43,802,697 | 925,144 |
| 1877..... | | 720 | 1898..... | 37,375,678 | 885,485 |
| 1878..... | | | 1899..... | 15,799,518 | 466,950 |
| 1879..... | | 230 | 1900..... | 57,642,029 | 1,917,690 |
| 1880..... | | | 1901..... | 45,590,995 | 1,804,687 |
| 1881..... | | | 1902..... | 17,761,484 | 457,170 |
| 1882..... | | 32 | 1903..... | 18,624,303 | 426,466 |
| 1883..... | | 5 | 1904..... | 25,868,823 | 559,461 |
| 1884..... | | 36 | 1905..... | 41,657,403 | 1,046,541 |
| 1885..... | | | 1906..... | 21,436,022 | 736,007 |
| 1886..... | | | 1907..... | 25,591,883 | 1,029,898 |
| 1887..... | | 724 | 1908..... | 18,454,594 | 622,454 |
| 1888..... | | 18 | 1909..... | 17,528,028 | 493,642 |
| 1889..... | | 18 | 1910..... | 7,759,053 | 249,482 |
| 1890..... | | | 1911..... | 137,061 | 4,632 |
| 1891..... | | 5,000 | 1912..... | 299,240 | 8,193 |
| 1892..... | | 2,509 | 1913..... | 329,960 | 9,136 |
| 1893..... | | 3,099 | 1914..... | 756,673 | 22,188 |

The production of lead as already shown was in 1914, 18,169 tons, while the exports were 378 tons, leaving a balance of 17,791 tons, as the consumption of Canadian lead.

The imports of lead in 1914 amounted to 10,924 tons valued at \$1,042,538 against 10,884 tons valued at \$1,215,433 in 1913. There was included herein certain manufactures of lead valued at \$99,285 in 1914 and at \$155,178 in 1913 for which no equivalent quantity is given.

Thus it will be found that the consumption of lead in 1914 exceeded 29,000 tons, and was about one thousand less than in 1913.

The principal imports of lead during 1912, 1913, and 1914 were as follows:—

Imports of Lead 1912, 1913, and 1914.

| | Calendar year 1912. | | Calendar year 1913. | | Calendar year 1914. | |
|---|------------------------|-----------|------------------------|-----------|------------------------|-----------|
| | Tons. | Value. | Tons. | Value. | Tons. | Value. |
| | | \$ | | \$ | | \$ |
| Old scrap, pig, and block..... | 14,089 | 940,583 | 5,600 | 464,117 | 7,722 | 590,557 |
| Bars and sheets..... | 961 | 93,702 | 747 | 62,527 | 481 | 41,244 |
| Pipe..... | 344 | 32,423 | 233 | 21,679 | 283 | 26,282 |
| Shot and bullets..... | 239 | 23,163 | 215 | 19,582 | 90 | 10,542 |
| Manufactures of lead..... | | 144,571 | | 155,178 | | 99,285 |
| Tea lead..... | 1,606 | 167,716 | 1,737 | 217,009 | 844 | 108,097 |
| Litharge..... | 1,296 | 113,941 | 500 | 50,734 | 543 | 52,525 |
| Total..... | 18,535 | 1,516,099 | 9,032 | 990,826 | 9,963 | 928,532 |
| Metallic lead contained in imported lead pig- ments..... | 2,345 | 290,122 | 1,852 | 224,607 | 961 | 114,006 |
| | 20,880 | 1,806,221 | 10,884 | 1,215,433 | 10,924 | 1,042,538 |

Details of the annual imports since 1880 are given in the following tables:—

Imports of Lead in Pigs, Bars, Sheets, etc.

| Fiscal Year. | OLD, SCRAP, AND PIG. | | Average price. | BARS, BLOCKS, SHEETS. | | Average price. | TOTAL. | |
|----------------|------------------------------|---------|----------------|-----------------------|--------|----------------|---------|-----------|
| | Cwt. | Value. | | Cwt. | Value. | | Cwt. | Value. |
| | | \$ | \$ cts. | | \$ | \$ cts. | | \$ |
| 1880..... | | | | | | | 30,298 | 124,117 |
| 1881..... | 16,236 | 56,919 | 3 51 | 18,222 | 70,744 | 3 88 | 34,458 | 127,663 |
| 1882..... | 36,655 | 120,870 | 3 30 | 10,540 | 35,728 | 3 39 | 47,195 | 156,598 |
| 1883..... | 48,680 | 148,759 | 3 06 | 8,591 | 28,785 | 3 35 | 57,371 | 177,544 |
| 1884..... | 39,409 | 103,413 | 2 62 | 9,704 | 28,458 | 2 93 | 49,113 | 131,871 |
| 1885..... | 36,106 | 87,038 | 2 41 | 9,362 | 24,396 | 2 61 | 45,468 | 111,434 |
| 1886..... | 39,945 | 110,947 | 2 78 | 9,793 | 28,948 | 2 96 | 49,738 | 139,895 |
| 1887..... | 61,160 | 173,477 | 2 84 | 14,153 | 41,746 | 2 95 | 75,313 | 215,223 |
| 1888..... | 68,678 | 196,845 | 2 87 | 14,957 | 45,900 | 3 06 | 83,635 | 242,745 |
| 1889..... | 74,223 | 213,132 | 2 87 | 14,173 | 43,482 | 3 07 | 88,396 | 256,614 |
| 1890..... | 101,197 | 283,096 | 2 80 | 19,083 | 59,484 | 3 12 | 120,280 | 342,580 |
| 1891..... | 86,382 | 243,033 | 2 81 | 15,646 | 48,220 | 3 08 | 102,028 | 291,253 |
| 1892..... | 97,375 | 254,384 | 2 61 | 11,299 | 32,368 | 2 86 | 108,674 | 286,752 |
| 1893..... | 94,485 | 215,521 | 2 28 | 12,403 | 32,286 | 2 60 | 106,888 | 247,807 |
| 1894..... | 70,223 | 149,440 | 2 13 | 8,486 | 20,451 | 2 41 | 78,709 | 169,891 |
| 1895..... | 67,261 | 139,290 | 2 07 | 6,739 | 16,315 | 2 42 | 74,000 | 155,605 |
| 1896..... | 72,433 | 173,162 | 2 39 | 8,575 | 23,169 | 2 70 | 81,008 | 196,331 |
| 1897..... | 65,279 | 158,381 | 2 43 | 10,516 | 29,175 | 2 77 | 75,795 | 187,556 |
| | OLD, SCRAP, PIG, AND BLOCK.* | | | BARS, AND SHEETS.† | | | TOTAL. | |
| 1898..... | 88,420 | 260,779 | 2 95 | 22,214 | 39,041 | 1 76 | 110,634 | 299,820 |
| 1899..... | 114,659 | 283,432 | 2 47 | 44,796 | 39,833 | 0 89 | 159,455 | 323,265 |
| 1900..... | 62,361 | 207,819 | 3 33 | 15,493 | 53,506 | 3 45 | 77,854 | 251,325 |
| 1901..... | (a) 85,321 | 97,011 | 1 14 | 16,295 | 78,316 | 4 81 | 101,616 | 175,327 |
| 1902..... | (a) 122,279 | 104,672 | 0 86 | 18,596 | 49,261 | 2 65 | 140,875 | 153,933 |
| 1903..... | (a) 98,530 | 67,821 | 0 69 | 11,535 | 35,398 | 3 07 | 110,065 | 103,219 |
| 1904..... | (a) 94,602 | 121,165 | 1 28 | 14,102 | 39,644 | 2 81 | 108,704 | 160,809 |
| 1905..... | (a) 57,074 | 133,775 | 2 34 | 17,792 | 51,972 | 2 92 | 74,866 | 185,747 |
| 1906..... | 82,729 | 271,105 | 3 28 | 16,106 | 57,185 | 3 55 | 98,835 | 328,290 |
| 1907..... | 79,575 | 277,470 | 3 49 | 13,710 | 56,630 | 4 13 | 93,285 | 334,100 |
| 1908..... | 63,921 | 284,604 | 4 45 | 17,253 | 75,186 | 4 36 | 81,174 | 359,790 |
| 1909..... | 50,110 | 151,173 | 3 02 | 13,754 | 46,093 | 3 35 | 63,864 | 197,266 |
| Calendar year. | | | | | | | | |
| 1910..... | 120,591 | 346,516 | 2 87 | 17,697 | 45,674 | 2 58 | 138,288 | 392,190 |
| 1911..... | 199,774 | 495,923 | 2 48 | 30,837 | 55,458 | 1 80 | 230,611 | 551,381 |
| 1912..... | 281,787 | 940,583 | 3 34 | 19,212 | 93,702 | 4 88 | 300,999 | 1,034,285 |
| 1913..... | 111,995 | 464,117 | 4 14 | 14,944 | 62,527 | 4 18 | 126,939 | 526,644 |
| 1914..... | 154,441 | 590,557 | 3 82 | 9,615 | 41,244 | 4 29 | 164,056 | 631,801 |

*Duty 15 per cent.

†Duty 25 per cent.

(a) Includes Canadian lead ore sent to the United States for refining, imported at price of refining only.

Imports of Lead Manufactures.

| Calendar Year. | Pipe Lead. | | Shot and Bullets. | | Tea Lead. | | Other manufactures of lead. |
|----------------|------------|--------|-------------------|--------|-----------|---------|-----------------------------|
| | Pounds. | Value. | Pounds. | Value. | Pounds. | Value. | Value. |
| | | \$ | | \$ | | \$ | \$ |
| 1910..... | 403,012 | 15,365 | 6,903 | 311 | 2,371,136 | 117,399 | 107,688 |
| 1911..... | 512,737 | 19,426 | 8,912 | 1,053 | 2,688,211 | 134,160 | 108,012 |
| 1912..... | 688,383 | 32,423 | 477,047 | 23,163 | 3,212,861 | 167,716 | 144,571 |
| 1913..... | 466,753 | 21,679 | 429,656 | 19,582 | 3,475,171 | 217,009 | 155,178 |
| 1914..... | 565,762 | 26,282 | 180,639 | 10,542 | 1,687,029 | 108,097 | 99,285 |

Imports of Litharge.

| Fiscal Year. | Cwt. | Value. | Fiscal Year. | Cwt. | Value. | Fiscal Year. | Cwt. | Value. |
|--------------|--------|----------|--------------|--------|----------|-----------------|----------|-----------|
| 1880..... | 3,041 | \$14,334 | 1893.... | 7,685 | \$24,401 | 1906.... | 10,165 | \$ 39,836 |
| 1881..... | 6,126 | 22,129 | 1894.... | 38,547 | 28,685 | 1907.... | 11,311 | 49,183 |
| 1882..... | 4,900 | 16,651 | 1895.... | 11,955 | 32,953 | 1908.... | 19,052 | 90,785 |
| 1883..... | 1,532 | 6,173 | 1896.... | 10,710 | 32,817 | 1909.... | 12,117 | 43,597 |
| 1884..... | 5,235 | 18,132 | 1897.... | 12,028 | 34,538 | Calendar year:— | | |
| 1885..... | 4,990 | 16,156 | 1898.... | 10,446 | 32,904 | | | |
| 1886..... | 4,928 | 16,003 | 1899.... | 9,530 | 32,518 | | 1910.... | 15,541 |
| 1887..... | 6,397 | 21,865 | 1900.... | 9,139 | 29,176 | | 1911.... | 17,979 |
| 1888..... | 7,010 | 23,808 | 1901.... | 11,132 | 51,944 | | 1912.... | 25,925 |
| 1889..... | 8,089 | 31,082 | 1902.... | 13,002 | 47,021 | | 1913.... | 10,009 |
| 1890..... | 9,453 | 31,401 | 1903.... | 13,921 | 47,761 | | 1914.... | 10,863 |
| 1891..... | 7,979 | 27,613 | 1904.... | 9,894 | 32,633 | | | 52,525 |
| 1892..... | 10,384 | 34,343 | 1905.... | 17,865 | 57,736 | | | |

Imports of White and Red Lead in 1912, 1913, and 1914.

| | Calendar Year 1912. | | Calendar Year 1913. | | Calendar Year 1914. | |
|--------------------------------------|---------------------|---------|---------------------|---------|---------------------|---------|
| | Lbs. | Value. | Lbs. | Value. | Lbs. | Value. |
| | | \$ | | \$ | | \$ |
| Lead, white, dry..... | 2,499,725 | 138,627 | 1,162,082 | 61,424 | 363,136 | 20,279 |
| Lead, white, ground in oil..... | 714,362 | 37,916 | 1,057,683 | 59,444 | 546,961 | 31,654 |
| Lead, red, dry and orange mineral... | 2,539,767 | 113,579 | 2,389,460 | 103,739 | 1,451,264 | 62,073 |
| | 5,753,854 | 290,122 | 4,609,225 | 224,607 | 2,361,361 | 114,006 |

Imports of Dry White and Red Lead and Orange Mineral, and White Lead Ground in Oil.

| Fiscal Year. | Lbs. | Value. | Average price. | Fiscal Year. | Lbs. | Value. | Average price. |
|--------------|------------|---------|----------------|----------------|------------|---------|----------------|
| | | \$ | Cts. | | | \$ | Cts. |
| 1885..... | 5,540,753 | 198,913 | 3·69 | 1901..... | 10,241,601 | 461,368 | 4·50 |
| 1886..... | 6,703,077 | 213,258 | 3·18 | 1902..... | 15,584,164 | 603,582 | 3·87 |
| 1887..... | 6,998,820 | 233,725 | 3·34 | 1903..... | 19,208,786 | 758,371 | 3·95 |
| 1888..... | 6,361,334 | 216,654 | 3·41 | 1904..... | 16,925,585 | 662,098 | 3·91 |
| 1889..... | 7,066,465 | 267,236 | 3·78 | 1905..... | 17,376,588 | 638,381 | 3·67 |
| 1890..... | 10,859,672 | 381,959 | 3·52 | 1906..... | 10,412,891 | 417,444 | 4·01 |
| 1891..... | 8,560,615 | 337,407 | 3·94 | 1907..... | 5,956,626 | 290,629 | 4·88 |
| 1892..... | 10,288,766 | 351,686 | 3·42 | 1908..... | 7,830,860 | 420,537 | 5·37 |
| 1893..... | 10,865,183 | 364,680 | 3·36 | 1909..... | 4,687,416 | 195,258 | 4·17 |
| 1894..... | 10,958,170 | 353,053 | 3·22 | Calendar year: | | | |
| 1895..... | 8,780,052 | 282,353 | 3·22 | 1910..... | 3,769,927 | 144,741 | 3·84 |
| 1896..... | 11,711,496 | 367,569 | 3·14 | 1911..... | 4,072,433 | 169,501 | 4·16 |
| 1897..... | 10,310,463 | 347,539 | 3·37 | 1912..... | 5,753,854 | 290,112 | 5·04 |
| 1898..... | 12,682,808 | 448,659 | 3·54 | 1913..... | 4,609,225 | 224,607 | 4·87 |
| 1899..... | 14,507,945 | 514,842 | 3·55 | 1914..... | 2,361,361 | 114,006 | 4·83 |
| 1900..... | 14,679,920 | 634,492 | 4·32 | | | | |

British Columbia.

Almost all of the lead ore mined in British Columbia is smelted and refined at Trail, B.C.

The production of refined lead together with a small quantity of lead in ores exported amounted, in 1914, to 36,289,845 pounds as against 37,626,899 pounds in 1913, a decrease of about 8·5 per cent.

According to the Provincial Department of Mines, 50,625,048 pounds of lead were contained in the lead ores shipped to the smelters during 1914.

The record given in the following table for the years 1909 to 1914 inclusive represents the recovery of lead at smelter or refinery as distinguished from the figures given for the same years in the table next succeeding, which indicate the quantities of lead contained in ore sent to the smelters.

British Columbia:—Production of Lead.

| Calendar Year | Lbs. | Value. | Price per lb. | Calendar Year. | Lbs. | Value. | Price per lb. |
|---------------|------------|-----------|---------------|----------------|------------|-----------|---------------|
| | | \$ | Cts. | | | \$ | Cts. |
| 1887..... | 204,800 | 9,216 | 4·40 | 1901..... | 51,582,906 | 2,235,603 | 4·334 |
| 1888..... | 674,500 | 29,813 | 4·42 | 1902..... | 22,536,381 | 917,005 | 4·069 |
| 1889..... | 165,100 | 6,488 | 3·93 | 1903..... | 18,089,283 | 766,443 | 4·237 |
| 1890..... | Nil. | ..... | ..... | 1904..... | 36,646,244 | 1,579,086 | 4·309 |
| 1891..... | Nil. | ..... | ..... | 1905..... | 56,580,703 | 2,663,254 | 4·707 |
| 1892..... | 808,420 | 33,064 | 4·09 | 1906..... | 52,408,217 | 2,964,733 | 5·657 |
| 1893..... | 2,131,092 | 79,490 | 3·73 | 1907..... | 47,738,703 | 2,542,086 | 5·325 |
| 1894..... | 5,703,222 | 187,636 | 3·29 | 1908..... | 43,195,733 | 1,814,221 | 4·200 |
| 1895..... | 16,461,794 | 531,716 | 3·23 | 1909..... | 45,857,424 | 1,692,139 | *3·690 |
| 1896..... | 24,199,977 | 721,159 | 2·98 | 1910..... | 32,987,508 | 1,216,249 | *3·687 |
| 1897..... | 38,841,135 | 1,390,513 | 3·58 | 1911..... | 23,784,969 | 827,717 | †3·480 |
| 1898..... | 31,693,559 | 1,198,017 | 3·78 | 1912..... | 35,763,476 | 1,597,554 | †4·467 |
| 1899..... | 21,862,436 | 977,250 | 4·47 | 1913..... | 37,626,899 | 1,753,037 | †4·659 |
| 1900..... | 62,158,621 | 2,760,031 | 4·37 | 1914..... | 36,337,765 | 1,627,568 | †4·479 |

*Average prices at Toronto for years 1909 and 1910. For previous years average prices at New York.

†Average price at Montreal. Quotations furnished by Messrs. Thos. Robertson & Co., Montreal, Que.

British Columbia:—Production of Lead by Districts.*

Shipments of Lead contained in Ore from Mines.

| | 1908. | 1909. | 1910. | 1911. | 1912. | 1913. | 1914. |
|----------------------|------------|------------|------------|------------|------------|------------|------------|
| | Lbs. | Lbs. | Lbs. | Lbs. | Lbs. | Lbs. | Lbs. |
| Cassiar..... | | | 1,695 | 238,578 | 41,512 | 6,579 | ..... |
| East Kootenay— | | | | | | | |
| Fort Steele..... | 30,204,788 | 27,004,528 | 23,874,562 | 17,158,069 | 18,238,238 | 18,525,083 | 24,863,105 |
| Other districts..... | 358,270 | 18,724 | 66,010 | ..... | 2,249,237 | 2,495,355 | ..... |
| West Kootenay— | | | | | | | |
| Ainsworth..... | 4,790,216 | 10,298,343 | 2,558,353 | 289,009 | 4,863,894 | 9,027,861 | 8,069,525 |
| Nelson..... | 345,424 | 1,097,069 | 1,245,844 | 1,928,836 | 2,293,000 | 1,936,418 | 2,004,436 |
| Slocan..... | 6,572,268 | 4,976,199 | 6,406,358 | 6,705,571 | 16,944,811 | 22,648,766 | 15,233,910 |
| Other districts..... | 903,552 | 979,916 | 470,241 | 522,615 | 240,762 | 521,771 | 128,912 |
| Yale..... | 21,215 | 21,567 | 35,683 | 29,719 | ..... | 45,982 | 1,678 |
| Cariboo— | | | | | | | |
| Omineca..... | | | | | | 156,862 | 323,482 |
| | 43,195,733 | 44,396,346 | 34,658,746 | 26,872,397 | 44,871,454 | 55,364,677 | 50,625,048 |

*From the Report of the Minister of Mines, B.C.

It will be noted that the Fort Steele district produced over 49 per cent of the total; Slocan^o 30 per cent; Ainsworth nearly 16 per cent, and Nelson nearly 4 per cent. The shipments from New Hazelton were over double those of the previous year.

Yukon.

A few small shipments of lead-bearing ores were made from the Yukon in 1914. Although not important contributors to the tonnage of lead produced, they draw attention to the possibilities of the Territory, where as yet little lode mining has been done.

Some activity was shown in the Windy Arm section, and also near Minto Bridge, Duncan Mining Division.

During the last few years several properties have been developed and have shipped occasionally, but they have been handicapped by the high cost of development and supplies and by the heavy transportation charges.

Bounties.—In 1901, and again in 1903, the Dominion Government, to encourage the lead industry, authorized the payment of a bounty on the production of lead. The Act of 1903 provided for the payment, under certain restrictions, of 75 cents per hundred pounds on lead contained in ore mined and smelted in Canada, provided that when the standard price of pig lead in London, England, exceeded £12 10s. per ton of 2,240 pounds, such bounty should be reduced proportionately by the amount of such excess. Thus, when the price of lead in London rose to £16, or over, per long ton, the bounty ceased. As the price of lead exceeded £16 sterling on the London market for a considerable period during 1906 and 1907 the bounty paid during those years was comparatively small.

The Act of 1903 provided that payment of bounty should cease on June 30, 1908, and as only a portion of the funds provided had been used, a new Act was passed in the latter year providing for further bounty payments at

the rate of 75 cents per hundred pounds, or approximately £3 10s. per ton of 2,240 pounds, subject to the restriction that when the price of lead in London exceeds £14 10s. the bounty shall be reduced by such excess.

The Act of 1908 expired in 1913, and a new Act was passed extending the bounty for a further period of five years, with the same provisions. The text of this Act follows:—

3-4 GEORGE V, CHAPTER 29.

An Act Respecting the Payment of Bounties on Lead Contained in Lead-bearing Ores Mined in Canada.

(Assented to June 6, 1913.)

Whereas, under the provisions of chapter 31 of the statutes of 1903 and of chapter 43 of the statutes of 1908, as amended by chapter 37 of the statutes of 1910, the amount of bounty payable on lead contained in lead-bearing ores mined in Canada was not to exceed two million four hundred and fifty thousand dollars; and whereas, the time within which the said amount is payable for the purpose aforesaid expires, under the provisions of the said chapter 43, on the thirtieth day of June, nineteen hundred and thirteen, and there will then remain unexpended of the said sum approximately six hundred thousand dollars: Therefore His Majesty, by and with the advice and consent of the Senate and House of Commons of Canada, enacts as follows:—

1. This Act may be cited as *The Lead Bounties Act, 1913*.

2. The Governor in Council may authorize the payment of a bounty of seventy-five cents per one hundred pounds on lead contained in lead-bearing ores mined in Canada, on and after the first day of July, nineteen hundred and thirteen, such bounty to be paid to the producer or vendor of such ores: Provided that the sum to be paid as such bounty shall not exceed two hundred and fifty thousand dollars in any year ending on the thirtieth day of June; provided also that when it appears to the satisfaction of the Minister charged with the administration of this Act that the standard price of pig lead in London, England, exceeds fourteen pounds ten shillings sterling per ton of two thousand two hundred and forty pounds, such bounty shall be reduced by the amount of such excess.

2. The total amount of bounty payable under the provisions of chapter 31 of the statutes of 1903, chapter 43 of the statutes of 1908 (as amended by chapter 37 of the statutes of 1910), and of this Act, shall not exceed two million four hundred and fifty thousand dollars.

3. Payment of the said bounty may be made from time to time to the extent of sixty per cent upon smelter returns showing that the ore has been delivered for smelting at a smelter in Canada. The remaining forty

per cent may be paid at the close of the fiscal year, upon evidence that all such ore has been smelted in Canada.

2. If at the close of any year it appears that during the year the quantity of lead produced on which the bounty is authorized, exceeds sixteen thousand six hundred and sixty-seven tons of two thousand pounds, the rate of bounty shall be reduced to such sum as will bring the payments for the year within the limit mentioned in section 2 of this Act.

4. If at any time it appears to the satisfaction of the Governor in Council that the charges for transportation and treatment of lead ores in Canada are excessive, or that there is any discrimination which prevents the smelting of such ores in Canada on fair and reasonable terms, the Governor in Council may authorize the payment of bounty at such reduced rates as he deems just, on the lead contained in such ores mined in Canada, and exported for treatment abroad.

5. If at any time it appears to the satisfaction of the Governor in Council that products of lead are manufactured in Canada direct from lead ores mined in Canada without the intervention of the smelting process, the Governor in Council may make such provision as he deems equitable to extend the benefits of this act to the producers of such ores.

6. The Governor in Council may make regulations for carrying out the intention of this Act.

7. The bounties payable under the provisions of this Act shall cease and determine on the thirtieth day of June, one thousand nine hundred and eighteen.

The regulations under which the Act is administered are as follows:

1. The Minister of Trade and Commerce is charged with the administration of this Act.

2. All producers or vendors of lead-bearing ores who desire to avail themselves of the provisions of the Act above quoted, and to be paid bounty, shall, before making claim for such bounty, notify the Minister of their intention to claim under the provisions of the Act, and shall declare the name of the mine producing such ore, its situation, the names of the president, secretary, and manager, as well as the name of the official authorized to make claim. Notice shall be given the Minister of changes in ownership and management. Where the bounty is claimed by lessees, the consent of the owner shall be shown.

3. All claims for the payment of bounty shall be made and substantiated under the oath of the manager of the mine or of the official authorized to make the claim.

4. Claims may be made monthly, that is, immediately after the close of each calendar month, and be in such form, and contain such evidence, as may seem to the Minister, from time to time, necessary.

5. No claims made otherwise than in conformity with these regulations, and in form required by the Minister, shall be recognized, allowed or paid by the Minister.

6. The smelting of all such ore shall at all times be under the supervision of the officers of the Department of Trade and Commerce, appointed or detailed for the purpose.

7. The supervising officer may at any time demand and receive a portion of the floor sample of any ore delivered at the smelter for smelting purposes.

8. The rate of bounty shall be computed according to the London quotation upon the day the ore is taken into stock at the smelter, such day not to be later than the last day of the calendar month during which the ore was unloaded from cars at the smelter grounds.

9. The lead contents of ore shall, for the purpose of this Act, be ascertained by fire assay, as used in ordinary commercial assaying.

10. The books of the claimants, and those of the smelting works at which the ore is smelted, shall be at all times open to the inspection of such supervising officer, and of any officer of the Department of Trade and Commerce who may be detailed by the Minister for the purpose.

11. All claims shall be substantiated by the oath of the Manager of the smelting works at which the ores are smelted, and shall be verified and certified to by the officer of the Department of Trade and Commerce appointed to supervise the smelting at the works where it has been carried on.

12. The cost of the supervision shall be paid by the claimants and may be deducted pro rata according to the quantity smelted during the fiscal year, from the amount payable to such claimants at the close of each fiscal year.

Throughout nearly the whole of 1914 the London price for lead was above that at which the Dominion Government bounty on lead ceases to be paid.

The Bounties paid on lead since 1899 are given in the following table:—

Statement of Bounties Paid on Lead during the Fiscal Years 1899 to 1915.

| Year ending. | Bounty paid. | Year ending. | Bounty paid. |
|--------------------|--------------|------------------------------|--------------|
| | \$ | | \$ |
| June 30, 1899..... | 76,665 | March 31, 1907 (9 mos.)..... | 1,995 |
| " 30, 1900..... | 43,335 | " 31, 1908..... | 51,001 |
| " 30, 1901..... | 30,000 | " 31, 1909..... | 307,433 |
| " 30, 1902..... | | " 31, 1910..... | 340,542 |
| " 30, 1903..... | 4,380 | " 31, 1911..... | 248,534 |
| " 30, 1904..... | 195,627 | " 31, 1912..... | 179,288 |
| " 30, 1905..... | 330,645 | " 31, 1913..... | 68,065 |
| " 30, 1906..... | 90,196 | " 31, 1914..... | 8,179 |
| | | " 31, 1915..... | 3,217 |
| | | Total..... | 1,979,102 |

MERCURY.

There has been no production of mercury since 1897. The small production reported in 1895 and 1897 was derived from the deposits at the western end of Kamloops lake, B.C. These deposits consist of quartz veins containing pockets of cinnabar in a zone of decomposed Tertiary volcanic rocks.

Elsewhere in Canada mercury has been reported as also occurring in ores of the Cobalt district, and in the neighbourhood of Field, B.C., and Sechart on the west coast of Vancouver island.

The imports of mercury during the calendar year 1914 were 204,229 pounds valued at \$97,449.

Production of Mercury.

| Calendar Year. | Flasks. (76½ lbs.) | Price per flask. | Value. |
|----------------|-----------------------|---------------------|--------|
| | | \$ cts. | \$ |
| 1895..... | 71 | 33 00 | 2,343 |
| 1896..... | 58 | 33 44 | 1,940 |
| 1897..... | 9 | 36 00 | 324 |

Imports of Mercury.

| Fiscal Year. | Lbs. | Value. | Fiscal Year. | Lbs. | Value. | Fiscal Year. | Lbs. | Value. |
|--------------|--------|--------|--------------|---------|--------|----------------|---------|---------|
| | | \$ | | | \$ | | | \$ |
| 1882..... | 2,443 | 965 | 1893..... | 50,711 | 22,998 | 1904..... | 151,107 | 80,658 |
| 1883..... | 7,410 | 2,991 | 1894..... | 36,914 | 14,483 | 1905..... | 103,330 | 48,412 |
| 1884..... | 5,848 | 2,441 | 1895..... | 63,732 | 25,703 | 1906..... | 150,364 | 69,505 |
| 1885..... | 14,490 | 4,781 | 1896..... | 77,869 | 32,353 | 1907 (9 mos.) | 98,368 | 45,662 |
| 1886..... | 13,316 | 7,142 | 1897..... | 76,058 | 33,534 | 1908..... | 178,411 | 76,549 |
| 1887..... | 18,409 | 10,618 | 1898..... | 59,759 | 36,425 | 1909..... | 92,220 | 46,217 |
| 1888..... | 27,951 | 14,943 | 1899..... | 103,017 | 51,695 | Calendar Year: | | |
| 1889..... | 22,931 | 11,844 | 1900..... | 85,342 | 51,987 | 1910..... | 107,888 | 63,450 |
| 1890..... | 15,912 | 7,677 | 1901..... | 140,610 | 94,564 | 1911..... | 118,336 | 67,416 |
| 1891..... | 29,775 | 20,223 | 1902..... | 97,283 | 56,615 | 1912..... | 137,474 | 72,171 |
| 1892..... | 30,936 | 15,038 | 1903..... | 164,968 | 91,625 | 1913..... | 219,442 | 109,493 |
| | | | | | | 1914..... | 204,229 | 97,449 |

MOLYBDENUM.

The commercial production of molybdenum in Canada has been practically negligible, nevertheless the mineral has been found in numerous localities and in many of these in sufficient quantity to make its possible recovery a question of considerable interest, an interest which doubtless has been greatly stimulated by the high price which the ore, concentrated to 85 or 90 per cent molybdenite (MoS_2), has commanded.

During 1913 and 1914 some work was done on a number of properties in Ontario, Quebec, and British Columbia.

Shipments were made during 1914 from Ontario and British Columbia. The Ontario shipments consisted of one-half ton of molybdenite hand picked from the ore, while from British Columbia 16 tons¹ of ore were reported as shipped to Denver, Col., where it was concentrated, producing 2,814 pounds of concentrates for which 20 cents a pound was received. The total shipments in the form of molybdenite were 3,814 pounds valued at \$2,063.

In 1902, about 6,500 pounds of molybdenum ore valued at \$400, were reported as having been taken from a deposit in the township of Laxton, county of Victoria, by John Webber of Toronto.

In 1903, Mr. A. W. Chisholm of Kingston, reported the shipment to the United States, and elsewhere, of 85 tons of molybdenum ore valued at \$1,275, culled from about 500 or 600 tons of rock taken from the east half of lot 5, concession XIV, Sheffield township, Addington county.

Quebec:—During the year 1914, some development work was done by Mr. Charles Higgerty, of Ottawa, on a deposit of molybdenite situated in Eardley township, on lot 6, range XI. A vein is said to have been uncovered for a distance of 200 feet, and a few hundred pounds of molybdenite is said to have been produced from preliminary work.

The Aldfield Mineral Syndicate did a little work on lots 1 and 2, range III of Aldfield township.

Ontario:—The same Syndicate did a considerable amount of development on lots 16 and 17, concession XI of Brougham township, Renfrew county. A shipment of half a ton of cobbled ore valued at \$1,500 was reported.

The Algonican Development Co., Ltd., was preparing to operate at Mount St. Patrick in the same district, Brougham township, concession XI, lot 8. Machinery had been purchased and the Company was preparing to install a mill with an output of 1,000 lbs. of concentrates per day when the declaration of war terminated negotiations.

The property of Mr. James Legree was under option to an American Syndicate.

¹ The Gold Commissioner of the district reports the shipment as 23½ tons.

In the county of Haliburton, lot 11, concession X of Cardiff township, a property known as the "Treasure Hill" mine, was worked. Some ore was recovered and concentrated by special process, but no record of tonnage was obtained.

British Columbia:—The molybdenite claims of Lost Creek, 14 miles from Salmo, are owned by Messrs. Ross, Bennett and Benson, and have been operated under lease by Bell Bros. of Salmo. The Gold Commission reports¹:—

"Open-cuts have been run in on the dyke at intervals for a distance of 1,400 feet and ore encountered in all.

"In August a car of $23\frac{1}{2}$ tons of the ore was shipped to the Henry E. Wood Ore Testing Company, Denver, Colorado. This, for testing purposes, was divided into three different lots secured from separate portions of the dyke: No. 1, of 822 lb., going 30.175 per cent; No. 2, 29,895 lbs., 10.25 per cent.; and No. 3, 17,119 lbs., 9.33 per cent. At 20 cents a pound, the rate it was agreed to sell for early in the year, the car netted the owners \$815 clear of the cost of treatment and transportation.

"Another car of $25\frac{1}{2}$ tons is now about ready for shipment at Salmo, and a table test shows same to run about 14 per cent. The owners expect to receive 70 cents a pound on this shipment, having already had several bids on same from different points in the United States.

"There is estimated to be about 1,000 tons of lower-grade ore on the dump at the present time."

Prices:—There has been a small annual production of molybdenite in Australia since 1900 and previous to 1914 the price varied generally between \$400 and \$600 per ton for ore containing a minimum of 85 per cent MoS_2 .

In January of 1914 according to the Engineering and Mining Journal of New York "Such ore would be worth from \$8 to \$10 per unit, providing the ore be free from copper, arsenic, bismuth and tungsten. Any one of these elements will reduce the price of the ore. For instance: 90 per cent ore free from these elements is at present worth \$12.50 per unit, practically twice the price of tungsten ore. Lower grade ores are worth much less."

In July the London Mining Journal on the 25th inst., quoted the London market at from £500 to £550 per ton for first grade ore.

In September molybdenite containing a minimum of 90 per cent MoS_2 was quoted in London at from 115s. to 120s. per unit (120s. per unit = £540 per ton for 90 per cent ore).

During December as high as 135s. per unit was quoted (= £607 per gross ton or \$1.32 per pound for 90 per cent ore).

A special Report² describing the principal Canadian molybdenite occurrences discovered prior to 1910 has been published by the Mines Branch. The Department through its ore testing division has also under

¹ "Annual Report of the Minister of Mines, 1914, in the Province of British Columbia." pp. 328-329.

² No. 93, "Report on the Molybdenum Ores of Canada," by T. L. Walker, Ph.D., Mines Branch, Department of Mines, Ottawa, 1911.

taken an investigation of the concentration of these ores. This work is still in progress although a preliminary Report¹ has already been published in the Summary Report of the Mines Branch for 1913.

The following firms are believed to be purchasers of molybdenite; The Electro Metallurgical Company of America, New York; Primos Chemical Company, Primos, Penn.; DeGobia and Atkins, San Francisco, Cal.; Geo. G. Blackwood Sons & Co., The Albany, Liverpool, England; W. C. Willis & Co., 90 Mitchell St., Glasgow; J. Cameron, Swan & Co., 4 St. Nicholas Bldgs., Newcastle-on-Tyne, England; Sir A. G. Armstrong, Whitworth & Co., 8 Great George St., Westminster, London, England.

The annual production of molybdenite in Australia (Queensland and New South Wales) is shown in the accompanying table:—

Annual Production of Molybdenite in Australia.

| Year. | Queensland (a). | | New South Wales (b). | |
|---------------|-----------------|--------|----------------------|--------|
| | Long tons. | £ | Long tons. | £ |
| 1900..... | 11.00 | 561 | | |
| 1901..... | *26.00 | 1,609 | | |
| 1902..... | *41.00 | 5,502 | 15.00 | 1,841 |
| 1903..... | *24.00 | 2,100 | 29.00 | 4,458 |
| 1904..... | 21.65 | 2,746 | 25.25 | 2,726 |
| 1905..... | *84.75 | 10,454 | 19.40 | 2,507 |
| 1906..... | *129.15 | 17,034 | 32.65 | 4,798 |
| 1907..... | *17.15 | 9,660 | 21.65 | 3,564 |
| 1908..... | *168.85 | 14,686 | | |
| 1909..... | *156.75 | 13,820 | | |
| 1910..... | *139.90 | 16,914 | | |
| 1911..... | *228.50 | 24,842 | | |
| 1912..... | *197.50 | 19,261 | 56.55 | 3,706 |
| 1913..... | 66.00 | | 78.80 | 6,802 |
| 1914 (c)..... | 78.00 | 38,190 | 61.00 | 11,451 |

¹ No. 285, "Summary Report, Mines Branch, Department of Mines," 1913, pp. 66-71.

(a) From the Annual Report of the Dept. of Mines, New South Wales.

(b) From the Annual Report of the Under-Secy. for Mines, Queensland.

(c) From the London Mining Journal, Oct. 16th, 1915.

*Includes bismuth and wolfram.

NICKEL.

The industry based on the mining and metallurgical treatment of the nickel-copper ores of the Sudbury district, Ontario, ranks among the most important of Canada. Not only is there a considerable production of copper but the nickel, which is the most important product, supplies a very large proportion of the world's consumption of the metal.

The past three years' development has very largely increased the known ore reserves of the district. These nickel-copper deposits have been the subject of special reports by the Mines Branch and Geological Survey at Ottawa, and by the Ontario Bureau of Mines, Toronto.¹

The production of nickel ore, very active during the first six months of 1914, was checked on the declaration of war. Towards the end of the year the output was greatly increased, due no doubt to the great demand for nickel for war supplies, so that the production in 1914 was but little less than that of 1913, when the production of ore and its reduction to a Bessemer matte was the highest on record.

There were mined in 1914, 1,000,364 tons of ore, and smelted 947,053 tons; from which were produced 46,396 tons of Bessemer matte, carrying approximately 22,759 tons of nickel and 14,448 tons of copper, the net value of the matte being \$7,187,031. Thus, in 1914, the matte showed an increase in copper content and a falling off in nickel due to the great increase in production of ores by the Mond Nickel Co., and their reduction in the Coniston Smelter and the curtailment of the Canadian Copper Company's output of ores which are relatively lower in copper content.

The nickel-copper ore is reduced in smelters and converters to a Bessemer matte containing from 77 to 82 per cent of the combined metals, having averaged for the past year 49.0 per cent nickel and 31.1 per cent copper, against 52.7 per cent nickel and 27.4 per cent copper in 1913.

For the production of monel metal, a special matte is produced with contents of about 22 per cent copper and 58 per cent nickel, which is included in the total given above. Monel metal is produced directly from this matte without the intermediate refining of either the nickel or the copper.

¹ Report on Nickel and Copper Deposits of Sudbury, Ont., by A. E. Barlow, Geological Survey, Canada. No. 873, 1901.

The Sudbury Nickel Region, by A. P. Coleman, Ph.D., Bureau of Mines, Vol. XIV, Part III, 1904.

The Nickel Industry, with special reference to the Sudbury Region, Ont. Report by A. P. Coleman, Ph.D., Mines Branch, Ottawa, No. 170, 1913.

The following were the aggregate results of the production and treatment of nickel-copper ores in Ontario during the past four years:—

| | 1911. Tons of 2,000 lbs. | 1912. Tons of 2,000 lbs. | 1913. Tons of 2,000 lbs. | 1914. Tons of 2,000 lbs. |
|-------------------------------------|--------------------------------|--------------------------------|--------------------------------|--------------------------------|
| Ore mined..... | 612,511 | 737,726 | 784,697 | 1,000,364 |
| Ore smelted..... | 610,834 | 725,065 | 823,403 | 947,053 |
| Bessemer matte produced..... | 32,607 | 41,925 | 47,150 | 46,396 |
| Copper content of matte..... | 8,966 | 11,116 | 12,938 | 14,448 |
| Nickel "..... | 17,049 | 22,421 | 24,838 | 22,759 |
| Spot value of matte..... | \$4,945,592 | \$6,303,102 | \$7,076,945 | \$7,189,031 |
| Wages paid miners and smelters..... | \$1,830,526 | \$2,626,609 | \$3,291,956 | \$3,096,911 |
| Men employed..... | 1,885 | 3,110 | 3,486 | 3,379 |

The annual production of nickel since 1889 is shown in the following table:—

Annual Production of Nickel.

| Calendar Year. | Pounds of nickel in matte shipped. | Average price per lb. | Value. | Calendar Year. | Pounds of nickel in matte shipped. | Average price per lb. | Value. |
|----------------|--|-----------------------------|-----------|----------------|--|-----------------------------|------------|
| | | Cts. | \$ | | | Cts. | \$ |
| 1889..... | *830,477 | 60 | 498,286 | 1902..... | 10,693,410 | 47 | 5,025,903 |
| 1890..... | 1,435,742 | 65 | 933,232 | 1903..... | 12,505,510 | 40 | 5,002,204 |
| 1891..... | 4,035,347 | 60 | 2,421,208 | 1904..... | 10,547,883 | 40 | 4,219,153 |
| 1892..... | 2,413,717 | 58 | 1,399,956 | 1905..... | 18,876,315 | 40 | 7,550,526 |
| 1893..... | 3,982,982 | 52 | 2,071,151 | 1906..... | 21,490,955 | 42 | 8,948,834 |
| 1894..... | 4,907,430 | 38½ | 1,870,958 | 1907..... | 21,189,793 | 45 | 9,535,407 |
| 1895..... | 3,888,525 | 35 | 1,360,984 | 1908..... | 19,143,111 | 43 | 8,231,538 |
| 1896..... | 3,397,113 | 35 | 1,188,990 | 1909..... | 26,282,991 | 36 | 9,461,877 |
| 1897..... | 3,997,647 | 35 | 1,399,176 | 1910..... | 37,271,033 | 30 | 11,181,310 |
| 1898..... | 5,517,690 | 33 | 1,820,838 | 1911..... | 34,098,744 | 30 | 10,229,623 |
| 1899..... | 5,744,000 | 36 | 2,067,840 | 1912..... | 44,841,542 | 30 | 13,452,463 |
| 1900..... | 7,080,227 | 47 | 3,327,707 | 1913..... | 49,676,772 | 30 | 14,903,032 |
| 1901..... | 9,189,047 | 50 | 4,594,523 | 1914..... | 45,517,937 | 30 | 13,655,381 |

*Calculated from shipments made by rail.

The companies engaged in mining and smelting nickel ores are: The Canadian Copper Company, subsidiary to the International Nickel Company, with smelter at Copper Cliff, Ontario, and refinery at Bayonne, New Jersey; the Mond Nickel Company, Coniston, of London, England, with smelter at Coniston, Ont., and refinery at Clydach, Swansea, Wales. The British America Nickel Corporation continued development work. The Alexo mine, on the Porcupine Branch of the Timiskaming and Northern Ontario Railway, was again a producer, shipping nickel-copper ore to the Mond smelter at Coniston.

The above figures of the production of nickel do not include that recovered from the silver-cobalt ores of the Cobalt district. Returns are

received of the recovery as nickel-oxide at Canadian works, but a considerable amount of nickel is contained in ores exported for smelting for which no payment is received by the mines shipping and the amount finally recovered is impossible to ascertain.

The production of nickel-oxide during 1914 was reported as 392,512 pounds.¹

The total quantity of ore contained in ores shipped from this district has been estimated by the Ontario Bureau of Mines as follows:—

Nickel content of Ores shipped from Cobalt District.

(Estimated by Ontario Bureau of Mines).

| Calendar Year. | Ore and concentrates shipped. | Nickel content (estimated.) |
|----------------|-------------------------------|-----------------------------|
| | Tons | Tons |
| 1904..... | 158 | 14 |
| 1905..... | 2,144 | 75 |
| 1906..... | 5,335 | 160 |
| 1907..... | 14,788 | 370 |
| 1908..... | 25,624 | 612 |
| 1909..... | 30,677 | 766 |
| 1910..... | 34,282 | 604 |
| 1911..... | 26,633 | 392 |
| 1912..... | 21,933 | 429 |
| 1913..... | 20,877 | 377 |

Prices:—The price of refined nickel in New York during 1914 was quoted at 40 to 45 cents per pound for nickel shot, blocks or plaquettes, and electrolytic nickel 5 cents higher per pound.

The price of nickel in Europe in 1914, as given by London Mining Journal, was, from January until August, £167 10s. to £171 per long ton. No quotations were given during August, but in September the price started at £185 for the home trade, and was firm for the rest of the month at from £200 to £206 per long ton. In November quotations dropped to £186 (40½ cents per lb.) rising again at the end of December to from £186 to £206 per long ton.

¹ See chapter on "Cobalt."

Statistics of the average yearly prices in Europe, as given by the "Metallgesellschaft" are as follows:—

Yearly Average Prices of Nickel in Europe in Cents per Pound, and Marks per Kilogram.

| Year. | Prices in marks. per kilo. | Cents per lb. | Year. | Prices in marks per kilo. | Cents per lb. |
|-----------|----------------------------|---------------|-----------|---------------------------|---------------|
| 1889..... | 4.50 | 48.6 | 1902..... | 3.20 | 34.6 |
| 1890..... | 4.50 | 48.6 | 1903..... | 3.30 | 35.6 |
| 1891..... | 4.50 | 48.6 | 1904..... | 3.30 | 35.6 |
| 1892..... | 4.50 | 48.6 | 1905..... | 3.30 | 35.6 |
| 1893..... | 3.80 | 41.0 | 1906..... | 3.80 | 41.0 |
| 1894..... | 3.60 | 38.9 | 1907..... | 3.50 | 37.8 |
| 1895..... | 2.60 | 28.1 | 1908..... | 3.25 | 35.2 |
| 1896..... | 2.50 | 27.0 | 1909..... | 3.25 | 35.2 |
| 1897..... | 2.50 | 27.0 | 1910..... | 3.25 | 35.2 |
| 1898..... | 2.50 | 27.0 | 1911..... | 3.25 | 35.2 |
| 1899..... | 2.50 | 27.0 | 1912..... | 3.25 | 35.2 |
| 1900..... | 3.00 | 32.4 | 1913..... | 3.25 | 35.2 |
| 1901..... | 3.00 | 32.4 | | | |

As a result of the increased capacity of the Mond Nickel Co's. smelter, the exports of nickel to Great Britain in 1914 were almost double those of 1913. The exports to the United States fell off nearly 20 per cent.

The exports by countries during the past four years and the annual exports since 1890 are shown in the accompanying tables:—

| | 1911. Lbs. | 1912. Lbs. | 1913. Lbs. | 1914. Lbs. |
|-------------------------|---------------|---------------|---------------|---------------|
| To Great Britain..... | 5,023,393 | 5,072,867 | 5,164,512 | 10,291,979 |
| To United States..... | 27,596,578 | 39,148,993 | 44,224,119 | 36,015,642 |
| To other countries..... | | | 70,386 | 220,706 |
| | 32,619,971 | 44,221,860 | 49,459,017 | 46,528,327 |

Exports of Nickel Contained in Ore, Matte, or Other Product.

| Calendar Year. | Value. | Calendar Year. | Lbs. | Value. | Average price. |
|----------------|-----------|----------------|------------|-----------|----------------|
| | \$ | | | \$ | Cts. |
| 1890..... | 89,568 | 1903..... | 12,699,227 | 1,116,099 | 8.78 |
| 1891..... | 667,280 | 1904..... | 11,233,869 | 1,091,349 | 9.71 |
| 1892..... | 293,149 | 1905..... | 17,318,059 | 1,569,693 | 9.06 |
| 1893..... | 629,692 | 1906..... | 20,653,845 | 2,042,965 | 9.89 |
| 1894..... | 559,356 | 1907..... | 19,376,335 | 2,280,374 | 11.76 |
| 1895..... | 521,783 | 1908..... | 19,419,893 | 1,866,624 | 9.61 |
| 1896..... | 658,213 | 1909..... | 25,616,398 | 2,676,483 | 10.45 |
| 1897..... | 723,130 | 1910..... | 36,014,782 | 4,030,040 | 11.19 |
| 1898..... | 1,019,363 | 1911..... | 32,619,971 | 3,676,396 | 11.27 |
| 1899..... | 939,915 | 1912..... | 44,221,860 | 4,661,758 | 10.54 |
| 1900..... | 1,031,030 | 1913..... | 49,459,017 | 5,195,560 | 10.50 |
| 1901..... | 751,080 | 1914..... | 46,528,327 | 5,149,427 | 11.07 |
| 1902..... | 1,007,211 | | | | |

The imports of nickel are classed with those of nickel-silver and German silver and manufactures of these metals. There is also a considerable import of nickel-plated ware.

The imports of nickel, nickel-silver, German silver, etc., during 1913 and 1914 have been as follows:—

Imports of Nickel, Nickel-Silver and German Silver, 1913 and 1914.

| | 1913. | | 1914. | |
|--|---------|---------|---------|---------|
| | Lbs. | \$ | Lbs. | \$ |
| Nickel, nickel-silver & German silver in ingots or blocks..... | 42,726 | 14,705 | 70,564 | 25,362 |
| Nickel, nickel-silver and German silver in bars and rods and also in strips, sheets or plates..... | 549,765 | 147,815 | 549,288 | 130,065 |
| Manufactures of German, Nevada and nickel-silver, not plated..... | ..... | 86,672 | ..... | 83,185 |

In view of the large export of nickel from Canada to the United States and its refinement in that country, a record of the imports into, and exports of nickel from the United States, may be of special interest and is shown below as compiled from the "Foreign Commerce of the United States." The values of the United States exports which are not quoted in the tables, range from 31 to 39 cents per pound, and averaged about 34 cents in 1914.

United States:—Imports and Exports of Nickel.

| Imports of Nickel into United States. | 1911. | 1912. | 1913. | 1914. |
|---------------------------------------|------------|------------|------------|------------|
| Gross tons of ore and matte.....Tons | 23,993 | 33,101 | 37,623 | 29,564 |
| Nickel contents.....Lbs. | 29,545,967 | 42,168,769 | 47,194,101 | 35,006,700 |
| Exports of nickel from United States— | | | | |
| To France.....Lbs. | 5,463,358 | 5,083,947 | 3,631,858 | 3,457,157 |
| To Netherlands....." | 9,101,150 | 7,387,447 | 6,622,811 | 855,168 |
| To United Kingdom....." | 7,196,259 | 8,191,364 | 8,221,640 | 10,836,369 |
| To other countries....." | 3,338,819 | 5,152,258 | 10,096,779 | 12,446,438 |
| Total....." | 25,099,586 | 25,815,016 | 29,173,088 | 27,595,152 |

Bounty on Refined Nickel and Nickel-oxide:—Under the terms of "The Metal Refining Act, 1907" of the Province of Ontario (7 Edward VII, Chap. XIV) a bounty is authorized to be paid on nickel, cobalt, copper, and arsenic under certain conditions and restrictions during a period of five years following the passing of the Act (April, 1907). In March, 1912, the Act was amended to cover a further period of five years.

The sections affecting nickel ore are as follows:—

"The Treasurer of the Province may under the authority of such regulations as may from time to time be made in that behalf by the Lieu-

tenant Governor in Council pay in each year to the refiners of the metals or metal compounds hereinafter specified when refined in the Province from ores raised and mined in the Province, a bounty on each pound of such metal or compound so refined as follows:—

“Class 1. On refined metallic nickel or on refined oxide of nickel, 6 cents per pound on the free metallic nickel or on the nickel contained in the nickel-oxide, but nickel on which a bounty has already been paid in one form of product shall not be entitled to any further bounty in any other form, and the amount to be paid as bounty on the nickel products herein mentioned is not to exceed in all \$60,000 in any one year.”

The full text of the Act will be found in the chapter on “Cobalt.”

Nickel Production in Other Countries.

New Caledonia.

The only other important producer of nickel ore outside of Canada is the French Colony, New Caledonia. The exports from this source since 1898 have been as follows, in metric tons:—

Exports of Nickel Ore and Matte from New Caledonia.*

| Year. | Nickel ore. Metric tons | Year. | Nickel ore. Metric tons | Year. | Nickel ore. Metric tons | Nickel matte. Metric tons. |
|-----------|----------------------------|---------------|----------------------------|---------------|----------------------------|-------------------------------|
| 1898..... | 74,614 | 1904..... | 98,655 | 1909 (a)..... | 86,000 | ..... |
| 1899..... | 103,908 | 1905..... | 125,289 | 1910 (b)..... | 115,342 | 768 |
| 1900..... | 100,319 | 1906 (a)..... | 118,890 | 1911 (b)..... | 120,059 | 2,993 |
| 1901..... | 132,814 | 1907 (a)..... | 120,106 | 1912 (b)..... | 74,314 | 5,908 |
| 1902..... | 129,653 | 1908 (a)..... | 108,000 | 1913 (b)..... | 93,190 | 5,893 |
| 1903..... | 77,360 | | | 1914 (c)..... | 94,154 | 5,287 |

*Statistique de l'Industrie Minérale en France et en Algérie, Paris.

(a) The figures represent production.

(b) Statistics are taken from Mining Journal, London, May 14th, 1914.

(c) From the “Mineral Industry,” 1914, Vol. XXIII, p. 545.

Assuming the nickel in the ore to average 6 per cent, and in the matte 45 per cent, the production of nickel metal from New Caledonia ores since 1909 has been approximately as follows:—

| Year. | Metric tons (2204 pounds). |
|-----------|----------------------------|
| 1909..... | 5,160 |
| 1910..... | 7,267 |
| 1911..... | 8,550 |
| 1912..... | 7,117 |
| 1913..... | 8,243 |
| 1914..... | 8,028 |

Norway.

The following statistics showing the production of nickel ore and of nickel metal in Norway, from 1901 to 1911, have been compiled from the Annual Reports on "Mines and Quarries," published by the Home Office, London, Eng.

| Year. | Production of Nickel ore. | Ore smelted at Evje, Norway, and Nickel and Copper produced. | | |
|--------------|---------------------------------|---|--------------------------------|------------------------------|
| | Metric tons. | Ore smelted. Tons. | Nickel pro- duced. Tons. | Copper produced. Tons. |
| 1901..... | 2,018 | | | |
| 1902..... | 4,040 | | | |
| 1903..... | 5,670 | | | |
| 1904..... | 5,352 | | | |
| 1905..... | 5,477 | | | |
| 1906..... | 6,081 | 4,639 | 78 | 51 |
| 1907..... | 5,781 | 4,809 | 81 | 53 |
| 1908..... | 5,190 | 5,493 | 81 | 53 |
| 1909..... | 5,770 | 4,820 | 62 | 39 |
| 1910..... | 19,639 | 5,400 | 60 | 37 |
| 1911..... | 27,743 | | 172 | |
| *1912..... | 30,692 | | 488 | |
| **1913..... | | | 390 | |
| ***1914..... | | | 600 | |
| | | | 800 | |

* *In 1912.* According to "Mineral Industry," New York, 29,500 tons of ore from two mines in Norway, and 3,000 tons of ore imported from Greece were smelted at Evje and the matte refined at Christiansand producing 400 tons of nickel and 200 tons of copper.

** *In 1913.* The production has been officially reported as 600 metric tons of nickel.

*** *In 1914.* The London Mining Journal of Sept. 19th, 1914, reports that "the Evje nickel works, near Christiansand which were temporarily shut down have with a new supply of raw material been started again on their former scale." The production is reported to have exceeded that of 1913, and is estimated on reliable authority at 800 tons.

Prussia.

The annual production of nickel ore in Prussia from 1902 to 1911, as compiled from the "Mines and Quarries," Home Office Report is given herewith:—

| Year. | Metric tons. | Year. | Metric tons. |
|-----------|--------------|------------|--------------|
| 1902..... | 11,816 | 1908..... | 8,238 |
| 1903..... | 14,058 | 1909..... | 10,095 |
| 1904..... | 13,518 | 1910..... | 10,053 |
| 1905..... | 10,743 | 1911..... | 9,608 |
| 1906..... | 7,472 | 1912*..... | 12,091 |
| 1907..... | 7,557 | 1913*..... | 13,538 |

*Engineering and Mining Journal, Dec. 26, 1914.

This production is obtained chiefly from one mine the ore from which is reported to average less than 2 per cent in nickel.

Greece.

The production of nickel ore in Greece from 1909 to 1912 is reported as follows by the same authority:—

| <i>Year.</i> | <i>Metric tons.</i> |
|--------------|---------------------|
| 1909..... | 104 |
| 1910..... | 110 |
| 1911..... | 7,983 |
| 1912..... | 15,111 |

"In Greece in 1909 garnierite was discovered at Thebes and Lokeis. The ore contained 4 to 5½ per cent nickel and altogether 24,000 tons were exported." (Probably total exports 1909 to 1912 inclusive).‡

The production of raw nickel at smelting works (partly estimated) is given by "Metallgesellschaft," as follows:—

Production of Raw Nickel at Smelting Works, in Metric Tons.

| Producing country. | 1906. | 1907. | 1908. | 1909. | 1910. | 1911. | 1912. | 1913. | 1914. |
|--|--------|--------|--------|--------|--------|--------|--------|--------|-------|
| United States of North America and Canada..... | 6,500 | 6,500 | 7,000 | 9,000 | 10,000 | 12,000 | 15,000 | ..... | ..... |
| England..... | 3,200 | 3,200 | 3,000 | 3,200 | 3,500 | 4,500 | 5,200 | ..... | ..... |
| Germany*..... | 2,800 | 2,600 | 3,000 | 3,500 | 4,500 | 5,000 | 5,000 | ..... | ..... |
| France..... | 1,800 | 1,800 | 1,400 | 1,200 | 1,500 | 2,000 | 2,100 | ..... | ..... |
| Other countries..... | ..... | ..... | 200 | 400 | 600 | 1,000 | 1,200 | ..... | ..... |
| Total production†..... | 14,300 | 14,100 | 14,600 | 17,300 | 20,100 | 24,500 | 28,500 | 30,000 | ..... |

*The figures of production stated for Germany only cover the output in the Kingdom of Prussia; nickel is also produced in the Kingdom of Saxony, but no data are obtainable of this production which is, however, not important.

†The entire production of nickel, apart from quite insignificant quantities obtained in Germany, Norway, and the United States of America, comes from New Caledonia and Canadian ores.

‡From the "Mineral Industry," 1912, p. 617.

PLATINUM AND PALLADIUM.

In past years the chief source of the platinum production of Canada was the placer gravels of British Columbia, principally in the Similkameen district. During 1913 operators in the Cariboo district of British Columbia report a recovery of 18 crude ounces of platinum valued at \$489. More attention is being paid to the recovery of this metal especially in the Similkameen where it is proposed to re-work some of the old placers.

One or two companies operating in the Quesnel River district report small quantities of platinum with placer gold but the information is not sufficiently definite for record.

Annual Production of Platinum.

| Calendar Year. | Value. | Calendar Year. | Value. | Calendar Year. | Crude Ozs. | Value. |
|----------------|--------|----------------|--------|----------------|------------|--------|
| | \$ | | \$ | | | \$ |
| 1887..... | 5,600 | 1894..... | 950 | 1901..... | | 457 |
| 1888..... | 6,000 | 1895..... | 3,800 | 1902..... | | 46,502 |
| 1889..... | 3,500 | 1896..... | 750 | 1903..... | | 33,345 |
| 1890..... | 4,500 | 1897..... | 1,600 | 1904..... | | 10,872 |
| 1891..... | 10,000 | 1898..... | 1,500 | 1905..... | | 500 |
| 1892..... | 3,500 | 1899..... | 825 | 1906..... | | * |
| 1893..... | 1,800 | 1900..... | Nil. | 1907-1912..... | | ** |
| | | | | 1913..... | 18 | 489 |

*See under Palladium.

**See explanation in text.

Annual Production of Palladium.

| | Ozs. | Value. |
|---|-------|-----------|
| 1902 Palladium | 4,411 | \$ 86,014 |
| 1903 " | 3,177 | 61,952 |
| 1904 " | 952 | 13,564 |
| 1905 Metals of the platinum group | 1,562 | 28,116 |
| 1906 " | * 314 | 5,652 |
| 1907-1914..... |  | ..... |

*See explanation in text.

The nickel-copper ores of the Sudbury district also carry small quantities of the metals of the platinum group, and since 1902 considerable quantities of these metals have been recovered from the residues resulting from the treatment of the mattes from Sudbury.

The International Nickel Company have been good enough to inform us that the recovery of gold, silver, platinum, and palladium at their works in New Jersey for the six years ending December 31, 1912, was as follows:—

| Year. | Gold. | Silver. | Platinum. | Palladium. |
|-----------|------------|------------|-----------|------------|
| | Ozs. | Ozs. | Ozs. | Ozs. |
| 1907..... | 993·572 | 63,400·70 | 226·800 | 607·300 |
| 1908..... | 5,238·181 | 139,329·29 | 172·316 | 382·287 |
| 1909..... | 2,113·669 | 63,138·66 | 546·627 | 1,270·598 |
| 1910..... | 2,649·799 | 60,256·83 | 258·325 | 522·804 |
| 1911..... | 2,203·052 | 70,954·38 | 665·552 | 753·363 |
| 1912..... | 2,476·558 | 62,169·66 | 496·850 | 680·130 |
| | 15,674·831 | 459,249·52 | 2,366·470 | 4,216·482 |

In view, however, of the fact that other material has been treated in the Company's works in addition to the nickel-copper mattes from Copper Cliff, Ontario, it is impossible to state what proportion of the above recoveries was from Canadian sources, although it is, of course, safe to assume that part of these metals has been derived from the Sudbury District mattes. The Company reported there had been no production in 1913 and 1914 from Canadian ores.

Average Prices of Platinum.¹

(In dollars per ounce troy).

| | 1910. | 1911. | 1912. | 1913. | 1914. |
|--|-------|-------|-------|-------|-------|
| | \$ | \$ | \$ | \$ | \$ |
| New York refined platinum..... | 32·70 | 43·12 | 45·55 | 44·88 | 45·14 |
| St. Petersburg, Russia, 83%..... | 26·96 | 35·21 | 37·08 | 36·54 | ..... |
| Ekaterinburg Crude Metal Platinum..... | 26·37 | 35·09 | 37·05 | 36·25 | ..... |

¹ From quotation in Engineering and Mining Journal, p. 77, January 9th, 1915.

Annual Imports of Platinum.

| Fiscal Year. | Value. | Fiscal Year. | Value. | Fiscal Year. | Value. |
|--------------|--------|--------------|--------|--------------------|---------|
| | \$ | | \$ | | \$ |
| 1883..... | 113 | 1894..... | 7,151 | 1905..... | 61,719 |
| 1884..... | 576 | 1895..... | 3,937 | 1906..... | 54,494 |
| 1885..... | 792 | 1896..... | 6,185 | 1907 (9 mos.)..... | 113,485 |
| 1886..... | 1,154 | 1897..... | 9,031 | 1908..... | 60,390 |
| 1887..... | 1,422 | 1898..... | 9,781 | 1909..... | 45,534 |
| 1888..... | 13,475 | 1899..... | 9,671 | Calendar Year. | |
| 1889..... | 3,167 | 1900..... | 57,910 | 1910..... | 102,318 |
| 1890..... | 5,215 | 1901..... | 20,263 | 1911..... | 176,101 |
| 1891..... | 4,055 | 1902..... | 19,357 | 1912..... | 232,163 |
| 1892..... | 1,952 | 1903..... | 21,251 | 1913..... | 145,674 |
| 1893..... | 14,082 | 1904..... | 28,112 | 1914*..... | 79,614 |

*Platinum wire and platinum in bars, strips, sheets or plates; platinum retorts, pans, condensers, tubing and pipe, imported by manufacturers of sulphuric acid for use in their works; crucibles. Duty free.

SILVER.

In 1914 the total production of silver, including that produced as bullion, and the metal estimated as recovered from ores sent to smelters or otherwise treated, was 28,449,821 fine ounces, valued at \$15,593,630, compared with 31,845,803 fine ounces, valued at \$19,040,924 in 1913, showing a falling off of 3,395,982 fine ounces or 10·6 per cent in quantity, and \$3,447,294, or 18·2 per cent in value.

Statistics of the annual production of silver since 1887 are given in the following table:—

Annual Production of Silver 1887-1914.

| Year. | Ozs. | Value. | Average price per oz. | Year. | Ozs. | Value. | Average price per oz. |
|-----------|-----------|-----------|-----------------------|-----------|------------|------------|-----------------------|
| | | \$ | Cts. | | | \$ | Cts. |
| 1887..... | 355,083 | 347,271 | 98·00 | 1901..... | 5,539,192 | 3,265,354 | 58·95 |
| 1888..... | 437,232 | 410,998 | 94·00 | 1902..... | 4,291,317 | 2,238,351 | 52·16 |
| 1889..... | 383,318 | 358,785 | 93·60 | 1903..... | 3,198,581 | 1,709,642 | 53·45 |
| 1890..... | 400,687 | 419,118 | 104·60 | 1904..... | 3,577,526 | 2,047,095 | 57·22 |
| 1891..... | 414,523 | 409,549 | 98·00 | 1905..... | 6,000,023 | 3,621,133 | 60·35 |
| 1892..... | 310,651 | 272,130 | 86·00 | 1906..... | 8,473,379 | 5,659,455 | 66·79 |
| 1893..... | ..... | 330,128 | 77·00 | 1907..... | 12,779,799 | 8,348,659 | 65·33 |
| 1894..... | 847,697 | 534,049 | 63·00 | 1908..... | 22,106,233 | 11,686,239 | 52·86 |
| 1895..... | 1,578,275 | 1,030,299 | 65·28 | 1909..... | 27,529,473 | 14,178,504 | 51·50 |
| 1896..... | 3,205,343 | 2,149,503 | 67·06 | 1910..... | 32,869,264 | 17,580,455 | 53·49 |
| 1897..... | 5,558,456 | 3,323,395 | 59·79 | 1911..... | 32,559,044 | 17,355,272 | 53·30 |
| 1898..... | 4,452,333 | 2,593,929 | 58·26 | 1912..... | 31,955,560 | 19,440,165 | 60·83 |
| 1899..... | 3,411,644 | 2,032,658 | 59·58 | 1913..... | 31,845,803 | 19,040,924 | 59·79 |
| 1900..... | 4,468,225 | 2,740,362 | 61·33 | 1914..... | 28,449,821 | 15,593,630 | 54·81 |

From 1887 to 1893 the production ranged in value between \$300,000 and \$400,000, and was derived chiefly from Ontario and Quebec. The next three years saw a rapid increase in production, due to the development of the silver-lead deposits of British Columbia, and in 1896 a production of over \$2,000,000 is recorded. From that year until 1905 the production varied between \$2,000,000 and \$3,500,000 rising rapidly during the next six years to \$17,580,455 in 1910, as a result of the discovery of the rich ores of the Cobalt district. Since then there has been a falling off in quantity, but owing to the higher price of the metal the total value was higher in 1912 and 1913.

Ontario in 1905 produced 40·9 per cent of the output of Canada; in 1911 its percentage was 93·8, while in 1914 its percentage was 88·4 and that of British Columbia was 11·1.

Statistics of the annual production in each province are shown in the table following:—

Production of Silver by Provinces, 1887-1914.

| Calendar Year. | ONTARIO. | | QUEBEC. | | BRITISH COLUMBIA. | | YUKON TERRITORY | |
|----------------|------------|------------|---------|---------|-------------------|-----------|-----------------|---------|
| | Ozs. | Value. | Ozs. | Value. | Ozs. | Value. | Ozs. | Value. |
| | | \$ | | \$ | | \$ | | \$ |
| 1887..... | 190,495 | 186,304 | 146,898 | 143,666 | 17,690 | 17,301 | ..... | ..... |
| 1888..... | 208,064 | 195,580 | 149,388 | 140,425 | 79,780 | 74,993 | ..... | ..... |
| 1889..... | 181,609 | 169,986 | 148,517 | 139,012 | 53,192 | 49,787 | ..... | ..... |
| 1890..... | 158,715 | 166,016 | 171,545 | 179,436 | 70,427 | 73,666 | ..... | ..... |
| 1891..... | 225,633 | 222,926 | 185,584 | 183,357 | 3,306 | 3,266 | ..... | ..... |
| 1892..... | 41,581 | 36,425 | 191,910 | 168,113 | 77,160 | 67,592 | ..... | ..... |
| 1893..... | ..... | 8,689 | ..... | 126,439 | ..... | 195,000 | ..... | ..... |
| 1894..... | ..... | ..... | 101,318 | 63,830 | 746,379 | 470,219 | ..... | ..... |
| 1895..... | ..... | ..... | 81,753 | 53,369 | 1,496,522 | 976,930 | ..... | ..... |
| 1896..... | ..... | ..... | 70,000 | 46,942 | 3,135,343 | 2,102,561 | ..... | ..... |
| 1897..... | 5,000 | 2,990 | 80,475 | 48,116 | 5,472,971 | 3,272,289 | ..... | ..... |
| 1898..... | 85,000 | 49,521 | 74,932 | 43,655 | 4,292,401 | 2,500,753 | ..... | ..... |
| 1899..... | 202,000 | 120,352 | 40,231 | 23,970 | 2,939,413 | 1,751,302 | 230,000 | 137,034 |
| 1900..... | 161,650 | 99,140 | 58,400 | 35,817 | 3,958,175 | 2,427,548 | 290,000 | 177,857 |
| 1901..... | 151,400 | 89,250 | 41,459 | 24,440 | 5,151,333 | 3,036,711 | 195,000 | 114,953 |
| 1902..... | 145,000 | 75,632 | 42,500 | 22,168 | 3,917,917 | 2,043,586 | 185,900 | 96,985 |
| 1903..... | 17,777 | 9,502 | 28,600 | 15,287 | 2,996,204 | 1,601,471 | 156,000 | 83,362 |
| 1904..... | 206,875 | 118,376 | 15,000 | 8,583 | 3,222,481 | 1,843,935 | 133,170 | 76,201 |
| 1905..... | 2,451,356 | 1,479,442 | 19,620 | 11,841 | 3,439,417 | 2,075,757 | 89,630 | 54,093 |
| 1906..... | 5,401,766 | 3,607,894 | 17,686 | 11,813 | 2,990,262 | 1,997,226 | 63,665 | 42,522 |
| 1907..... | 9,982,363 | 6,521,178 | 16,000 | 10,452 | 2,745,448 | 1,793,519 | 35,988 | 23,510 |
| 1908..... | 19,398,545 | 10,254,847 | 13,299 | 7,030 | 2,631,389 | 1,391,058 | 63,000 | 33,304 |
| 1909..... | 24,822,099 | 12,784,126 | 13,233 | 6,815 | 2,649,141 | 1,364,387 | 45,000 | 23,176 |
| 1910..... | 30,366,366 | 16,241,755 | 7,593 | 4,061 | 2,407,887 | 1,287,883 | 87,418 | 46,756 |
| 1911..... | 30,540,754 | 16,279,443 | 18,435 | 9,827 | 1,887,147 | 1,005,924 | 112,708 | 60,078 |
| 1912..... | 29,214,025 | 17,772,352 | 9,465 | 5,758 | 2,651,002 | 1,612,737 | 81,068 | 49,318 |
| 1913..... | 28,411,261 | 16,987,377 | 34,573 | 20,672 | 3,312,343 | 1,980,483 | 87,626 | 52,392 |
| 1914..... | 25,139,214 | 13,779,055 | 57,737 | 31,646 | 3,159,897 | 1,731,971 | 92,973 | 50,959 |

Prices:—The average weekly price of fine silver in New York during 1914 varied between 59 cents per ounce towards the end of April, and a minimum of $48\frac{1}{2}$ cents in the last week of October, the average monthly price for the year being 54·811 cents per ounce, as against 59·791 cents in 1913, and 60·835 cents in 1912.

In London the average monthly price of silver in 1914 was 25·313 pence per standard ounce 0·925 fine, as against 27·576 pence in 1913.

The normal differential between the official prices at London and New York is about $1\frac{1}{2}$ cents per ounce, but the European war caused this to run up to 6 cents per ounce and even higher.

The average monthly prices of silver in New York from 1910 to 1914 and in London during 1914 are shown in tabulated form following.

Average Monthly Prices of Silver.

| Months. | New York.—Cents per fine ounce | | | | | London.— Pence per Standard ounce (a). |
|---------------------------|--------------------------------|--------|--------|--------|--------|---|
| | 1910. | 1911. | 1912. | 1913. | 1914. | 1914. |
| January..... | 52.375 | 53.795 | 56.260 | 62.938 | 57.572 | 26.553 |
| February..... | 51.534 | 52.222 | 59.043 | 61.642 | 57.506 | 26.573 |
| March..... | 51.454 | 52.745 | 58.375 | 57.870 | 58.067 | 26.788 |
| April..... | 53.221 | 53.325 | 59.207 | 59.490 | 58.519 | 26.958 |
| May..... | 53.870 | 53.308 | 60.880 | 60.361 | 58.175 | 26.704 |
| June..... | 53.462 | 53.043 | 61.290 | 58.990 | 56.471 | 25.948 |
| July..... | 54.150 | 52.630 | 60.654 | 58.721 | 54.678 | 25.219 |
| August..... | 52.912 | 52.171 | 61.606 | 59.293 | 54.344 | 25.979 |
| September..... | 53.295 | 52.440 | 63.078 | 60.640 | 53.290 | 24.260 |
| October..... | 55.490 | 53.340 | 63.471 | 60.793 | 50.654 | 23.199 |
| November..... | 55.635 | 55.719 | 62.792 | 58.995 | 49.082 | 22.703 |
| December..... | 54.428 | 54.905 | 63.365 | 57.760 | 49.375 | 22.900 |
| Average for the year..... | 53.486 | 53.304 | 60.835 | 59.791 | 54.811 | 25.313 |

(a) 925 parts fine.

Important quantities of silver are being produced in Canada both as fine metal and as silver bullion ranging in fineness from 850 to 998.2. Fine silver is produced at Trail, B.C., by the Consolidated Mining and Smelting Company of Canada, Limited, being derived chiefly from the silver-lead ores of that Province, and finds a market in Canada, the United States, and China.

The annual production of fine silver at Trail since 1904 has been as follows:—

| Year. | Fine ozs. | Year. | Fine ozs. |
|-----------|--------------|------------|--------------|
| 1904..... | 551,450 | 1910..... | 1,798,960 |
| 1905..... | 1,088,328 | 1911..... | 1,325,601 |
| 1906..... | 1,263,809 | 1912..... | 1,896,999 |
| 1907..... | 1,631,422 | 1913..... | 2,433,002 |
| 1908..... | 1,956,039 | 1914..... | 2,043,868 |
| 1909..... | 2,003,003 | Total..... | 17,992,481 |

In Ontario ores from the Cobalt district are treated by:—

The Coniagas Reduction Co., Thorold, Ont.

The Deloro Mining and Reduction Co., Deloro, Ont.

The Buffalo and Ontario Smelting and Refining Co., Kingston, Ont.

Dominion Refineries, Limited, North Bay, Ont.

Standard Smelting and Refining Co., North Bay, Ont.

Metals Chemical Co., Welland, Ont.

Canada Refining and Smelting Co., Orillia, Ont.

Silver bullion of a fineness varying from 850 to 998.2 is produced at the works, other products being white arsenic, nickel and cobalt-oxides and mixed oxides. The silver bullion as a rule finds a market in the United States and in England.

Bullion shipped by these Ontario smelters in 1907 contained 4,449,722 fine ounces of silver; in 1908, 11,168,689 ounces; in 1911, 17,753,167 ounces; in 1913, 11,356,707 ounces; and in 1914, 9,042,993 fine ounces.

The decrease is accounted for by the treatment of the greater part of the high grade ore in the camp itself.

The bullion shipped from the mines and mills in the Cobalt district in 1914, is reported as 10,335,527 fine ounces.

United States smelters report the receipt of 7,206 tons of ore containing 3,966,301 fine ounces of silver.

The imports of silver bullion into Canada in 1914 were valued at \$629,279, as against imports to the value of \$840,245 in 1913 and \$1,100,344 in 1912.

The exports of silver during 1914 were 28,020,089 fine ounces valued at \$15,584,813, as against exports of 37,371,569 fine ounces valued at \$21,441,220 in 1913, and 34,911,922 fine ounces valued at \$19,494,416 in 1912.

Statistics of silver contained in ore, matte or other form exported from Canada since 1886 as compiled from the reports of Trade and Navigation, and published by the Customs Department, are shown in the following table:—

Exports of Silver in Ore, etc.

| Calendar Year. | Value. | Calendar Year. | Value. | Calendar Year. | Value. |
|----------------|---------|----------------|-----------|----------------|------------|
| | \$ | | \$ | | \$ |
| 1886..... | 25,957 | 1896..... | 2,271,959 | 1906..... | 5,686,444 |
| 1887..... | 206,284 | 1897..... | 3,576,391 | 1907..... | 9,941,849 |
| 1888..... | 219,008 | 1898..... | 2,902,277 | 1908..... | 12,403,482 |
| 1889..... | 212,163 | 1899..... | 1,623,905 | 1909..... | 15,719,909 |
| 1890..... | 204,142 | 1900..... | 2,341,872 | 1910..... | 15,649,537 |
| 1891..... | 225,312 | 1901..... | 2,026,727 | 1911..... | 15,807,366 |
| 1892..... | 56,688 | 1902..... | 1,820,058 | 1912..... | 19,494,416 |
| 1893..... | 213,695 | 1903..... | 1,989,474 | 1913..... | 21,441,220 |
| 1894..... | 359,731 | 1904..... | 1,904,394 | 1914..... | 15,584,813 |
| 1895..... | 994,354 | 1905..... | 2,777,218 | | |

Quebec.

The small quantity of silver credited to Quebec province for a number of years represents a small silver content of the pyritic ores mined at Eustis and Weedon, in the Eastern Townships. The production in 1914 was 57,737 fine ounces valued at \$31,646, as against 34,573 fine ounces valued at \$20,672 in 1913.

Ontario.

The production of silver in Ontario increased from 17,777 fine ounces in 1903 to 2,451,356 fine ounces in 1905 and reached a maximum of 30,540,754 fine ounces in 1911. The maximum value \$17,772,352 was reached in 1912.

In 1914 the production was 25,139,214 fine ounces valued at \$13,779,055, a decrease from 1913 of 11.5 per cent in quantity and 18.9 per cent in total value. The production includes 56,259 ounces contained in gold bullion in addition to the production of the Cobalt and adjacent silver camps.

The silver ores of the Cobalt district, which in the early days of the camp were all exported for treatment, are being reduced to an increasing extent each year within the camp in cyanide and other mills, with recovery of silver bullion. During 1914 over 41 per cent of the output was thus recovered as bullion in the district, while 36 per cent of the total was recovered by the silver smelters in Ontario, so that over 77 per cent of the Ontario production was recovered in the form of bullion within the Province.

There was shipped from the Cobalt district during 1914, as closely as could be ascertained, about 16,197 tons of ore and concentrates, containing, after deducting 5 per cent for the smelter losses, 14,747,428 ounces of silver. Over 745,000 tons of ore were treated during the year in the various mills of the district. The recovery of bullion in the district as metallics and from cyanide and high grade mills was 10,335,527 ounces.

In the following table a record of shipments since 1904 is given, the figures of the first three years being those published by the Ontario Bureau of Mines.

Silver Ore and Bullion Shipments from Cobalt Mines, 1904-1914.

| Year. | SHIPMENTS. | | SILVER CONTENT. | | SILVER IN OUNCES, PER TON. | | Silver bullion shipments. Fine ounces. | Total value of silver. |
|-----------|------------|--------------------|-----------------|-------------------|----------------------------|--------------|--|------------------------|
| | Ore. Tons. | Concentrate. Tons. | Ore. Ozs. | Concentrate. Ozs. | Ore. | Concentrate. | | |
| | | | | | | | | \$ |
| 1904..... | 158 | | 206,875 | | 1,309 | | | 118,376 |
| 1905..... | 2,144 | | 2,451,356 | | 1,143 | | | 1,473,192 |
| 1906..... | 5,335 | | 5,401,766 | | 1,013 | | | 3,607,894 |
| 1907..... | 14,644 | | 9,982,363 | | 682 | | | 6,521,178 |
| 1908..... | 25,682 | (a) | 19,398,545 | (a) | 755 | (a) | | 10,254,847 |
| 1909..... | 27,835 | 3,059 | 22,349,717 | 3,627,819 | 803 | 1,186 | 143,440 | 12,784,126 |
| 1910..... | 28,684 | 6,943 | 23,797,111 | 7,111,579 | 830 | 1,024 | 1,003,111 | 16,241,755 |
| 1911..... | 15,417 | 9,329 | 20,065,621 | 8,118,231 | 1,300 | 870 | 3,766,022 | 16,279,443 |
| 1912..... | 17,899 | 11,217 | 15,929,289 | 9,774,697 | 890 | 871 | 4,778,852 | 17,762,384 |
| 1913..... | (b) 29,741 | 10,838 | 13,601,286 | 8,260,888 | 457 | 762 | 7,599,929 | 16,962,105 |
| 1914..... | 5,235 | 12,376 | 7,652,374 | 9,061,191 | 1,462 | 732 | 10,335,527 | 13,748,219 |

(a) Included in ore.

(b) Includes some ore treated in customs mills in the District.

While the greater number of the mining companies, hold unrestricted titles to their properties, several are operated on a royalty basis on mining lands owned and leased by the Timiskaming and Northern Ontario Railway Commission. Mr. A. A. Cole, Mining Engineer to the Commission has in his annual report some interesting statistics from which the following tables and extracts have been drawn:—

Ore Shipments from the Cobalt District for the Years 1904 to 1914

| Mine. | 1904 to 1909 Incl. | 1910. | 1911. | 1912. | 1913. | 1914. | Totals 1904-1914. |
|--------------------------------|--------------------------|-----------|-----------|-----------|-----------|-----------|----------------------|
| | Tons. | Tons. | Tons. | Tons. | Tons. | Tons. | Tons. |
| Badger..... | ..... | ..... | 27-10 | ..... | ..... | ..... | 27-10 |
| Bailey..... | 155-65 | ..... | 20-00 | ..... | 150-35 | 20-50 | 388-07 |
| Beaver..... | 51-38 | 140-06 | 790-81 | 402-97 | 292-21 | 392-07 | 2,069-50 |
| Buffalo..... | 3,620-90 | 1,185-77 | 1,275-19 | 1,251-64 | 66-13 | ..... | 7,399-63 |
| Casey-Cobalt..... | 18-50 | 48-40 | 277-74 | 214-34 | 401-54 | 608-30 | 1,568-82 |
| Chambers-Ferland..... | 741-77 | 885-92 | 622-85 | 501-29 | 223-78 | 308-06 | 3,283-67 |
| City of Cobalt..... | 1,378-47 | 329-40 | 281-30 | 230-00 | 105-14 | 495-71 | 2,820-02 |
| Comet Cobalt (Drummond)..... | 2,798-33 | 2,194-41 | 714-83 | 458-85 | 610-06 | 587-03 | 7,363-51 |
| Cobalt Lake..... | 321-44 | 296-80 | 2,111-32 | 1,085-22 | 1,196-33 | 919-01 | 5,930-12 |
| Cobalt Townsite..... | 348-28 | 310-99 | 703-51 | 1,944-77 | 2,762-54 | 1,950-73 | 8,020-82 |
| Colonial..... | 55-38 | 178-60 | 114-10 | 86-48 | 21-56 | ..... | 456-12 |
| Coniagas..... | 4,317-17 | 1,261-46 | 1,813-89 | 2,119-87 | 1,620-40 | 1,217-26 | 12,350-05 |
| Crown Reserve..... | 3,824-87 | 2,814-25 | 977-32 | 561-65 | 791-15 | 1,067-00 | 10,036-24 |
| Foster..... | 818-08 | ..... | ..... | ..... | ..... | 4-50 | 822-58 |
| Green Meehan..... | 135-42 | ..... | 102-98 | ..... | 12-96 | ..... | 251-36 |
| †Hargrave..... | 28-45 | 343-68 | 102-44 | 17-35 | ..... | ..... | 491-92 |
| Hudson Bay..... | 1,987-40 | 260-33 | 898-88 | 694-55 | 609-14 | 647-95 | 5,098-25 |
| Imperial Cobalt..... | 14-61 | ..... | ..... | ..... | ..... | ..... | 14-61 |
| Kerr Lake..... | 2,366-72 | 5,088-78 | 1,292-58 | 788-10 | 933-35 | 628-42 | 11,097-95 |
| King Edward (Watts)..... | 534-89 | 134-12 | 20-00 | ..... | 87-21 | ..... | 776-22 |
| LaRose..... | 15,938-35 | 5,131-53 | 3,581-54 | 3,511-40 | 3,275-14 | 1,582-54 | 33,020-50 |
| †Lawson..... | 75-73 | ..... | ..... | ..... | ..... | ..... | 75-73 |
| Lost and Found..... | ..... | ..... | ..... | 65-20 | 8-80 | ..... | 74-00 |
| Lumsden..... | ..... | ..... | ..... | ..... | 20-00 | ..... | 20-00 |
| McKinley-Darragh..... | 4,154-84 | 2,393-39 | 3,238-64 | 2,673-40 | 2,865-66 | 2,903-50 | 18,229-43 |
| Mg. Corporation of Canada..... | ..... | ..... | ..... | ..... | ..... | 756-77 | 756-77 |
| Nancy Helen..... | 347-74 | ..... | ..... | ..... | ..... | ..... | 347-74 |
| Nipissing..... | 15,248-84 | 6,833-81 | 2,952-20 | 1,869-27 | 1,950-22 | 1,235-07 | 30,089-41 |
| North Cobalt..... | 6-87 | ..... | 3-00 | ..... | ..... | ..... | 9-87 |
| Nova Scotia..... | 778-90 | ..... | ..... | ..... | ..... | ..... | 778-90 |
| O'Brien..... | 6,510-73 | 608-57 | 628-44 | 711-43 | 703-43 | 523-21 | 9,685-81 |
| *Penn Canadian..... | 604-23 | 285-62 | 22-40 | 126-35 | 332-18 | 460-53 | 1,831-41 |
| Peterson Lake Leases..... | ..... | ..... | ..... | ..... | ..... | 122-52 | 122-52 |
| Gould..... | ..... | ..... | ..... | ..... | 9-00 | 50-65 | 59-65 |
| (Little Nipissing)..... | 80-29 | 313-76 | 28-45 | ..... | ..... | ..... | 422-50 |
| (Nova Scotia)..... | 121-15 | ..... | ..... | ..... | ..... | ..... | 121-15 |
| Seneca Superior..... | ..... | ..... | ..... | 432-97 | 457-93 | 398-96 | 1,289-86 |
| Provincial..... | 75-84 | 52-05 | 100-54 | 22-22 | ..... | ..... | 250-65 |
| †Princess..... | 3-93 | ..... | ..... | ..... | ..... | ..... | 3-93 |
| Red Rock..... | 45-71 | ..... | ..... | ..... | ..... | ..... | 45-71 |
| Right of Way..... | 2,534-65 | 981-41 | 666-06 | 243-24 | 146-12 | 184-16 | 4,755-64 |
| Rochester..... | ..... | 28-30 | ..... | ..... | ..... | ..... | 28-30 |
| Silver Bar..... | 0-58 | ..... | 2-72 | ..... | 20-00 | 20-00 | 43-30 |
| Silver Cliff..... | 309-50 | 156-84 | 92-30 | ..... | 48-05 | ..... | 606-69 |
| Silver Leaf..... | 252-39 | ..... | ..... | ..... | ..... | ..... | 252-39 |
| Silver Queen..... | 1,856-58 | ..... | ..... | 31-25 | 201-98 | 105-42 | 2,195-23 |
| Timiskaming..... | 1,851-66 | 1,119-12 | 855-60 | 967-31 | 406-26 | 417-56 | 5,617-51 |
| Timiskaming-Cobalt..... | 88-45 | ..... | ..... | ..... | ..... | ..... | 88-45 |
| Trethewey..... | 3,814-83 | 536-64 | 602-98 | 579-10 | 587-54 | 613-28 | 6,734-37 |
| †University..... | 231-51 | ..... | ..... | ..... | ..... | ..... | 231-51 |
| Victoria..... | 0-47 | ..... | ..... | ..... | ..... | ..... | 0-47 |
| Violet..... | 36-00 | ..... | ..... | ..... | ..... | ..... | 36-00 |
| Waldman..... | ..... | 38-81 | ..... | ..... | ..... | ..... | 38-81 |
| Wyandoh..... | ..... | 24-15 | ..... | ..... | ..... | ..... | 24-15 |
| Total..... | 78,487-58 | 33,976-97 | 24,921-71 | 21,631-79 | 20,916-16 | 18,220-71 | 198,154-92 |

†The shipment in 1905 was made by the White Silver Mining Co., the former owner of the Hargrave property.

†Shipments from Lawson, Princess, and University, since 1907, included with La Rose.

*Shipments up to the end of 1911 made by the Cobalt Central Mining Company former owner of the Penn Canadian.

The total amount of low grade ore treated at the concentrating and cyanide mills during 1914 was 743,531 tons, as against 664,845 tons in 1913, an increase of 11·8 per cent, while that in 1913 was 46 per cent over the previous year.

The tonnage of ore milled and concentrates produced during 1914 is given in the following table.

| Mills and mines. | Tons milled. | CONCENTRATES | | | Concentration ratio. |
|---|--------------|--------------|---------|----------------------|------------------------|
| | | Jigs. | Tables. | Total. | |
| Beaver..... | 27,069 | 121·2 | 227·8 | 349·0 | 78-1 |
| Buffalo..... | 55,254 | | | 832·0 | 66-1 |
| Casey-Cobalt..... | 24,236 | 21·3 | 534·4 | 555·7 | 43-1 |
| Cobalt Lake..... | 53,753 | 272·7 | 824·6 | 1,097·3 | 49-1 |
| Cobalt Reduction..... | 92,021 | | | 2,717·4 | 34-1 |
| Colonial:— | | | | | |
| Right of Way..... | 7,470 | | | 146·0 | 51-1 |
| Coniagas..... | 54,646 | 124·0 | 625·0 | 749·0 | 73-1 |
| Hudson Bay..... | 11,304 | 96·2 | 261·2 | 357·4 | 31-1 |
| McKinley-Darragh..... | 66,765 | 161·0 | 2,344·0 | 2,505·0 | 27-1 |
| Northern Customs:— | | | | | |
| La Rose..... | 52,273 | | 1,233·1 | 1,233·1 | 42-1 |
| Chambers Ferland..... | 10,625 | | 311·0 | 311·0 | 34-1 |
| Cobalt Alladin..... | 1,120 | | 38·6 | 38·6 | 29-1 |
| Cariboo-Cobalt..... | 1,042 | | 37·4 | 37·4 | 28-1 |
| O'Brien..... | 51,892 | 97·0 | 189·0 | 286·0 | 181-1 |
| Penn Canadian..... | 25,478 | 98·3 | 278·8 | 377·1 | 68-1 |
| Seneca Superior..... | 2,526 | 40·9 | 67·4 | 108·4 | 23-1 |
| Timiskaming..... | 18,779 | 82·8 | 292·8 | 375·6 | 50-1 |
| Trethewey..... | 35,215 | 53·2 | 553·4 | 606·6 | 58-1 |
| Total..... | 591,468 | | | 12,682·6 | 47-1 |
| Cyanide mills. | | | | Tons of ore treated. | Ozs. bullion produced. |
| Dominion Reduction:— | | | | | |
| Comet (Drummond)..... | | | | 20,160·2 | 1,586,783 |
| Crown Reserve..... | | | | 31,503·0 | |
| Drummond Fraction..... | | | | 3,674·0 | |
| Kerr Lake..... | | | | 17,601·5 | |
| Nipissing, Low Grade..... | | | | 79,125·0 | 2,261,023 |
| Total..... | | | | 152,063·7 | 3,847,806 |
| Total tons milled by water concentrating mills..... | | | | 591,468 | |
| Total tons milled by cyanide mills..... | | | | 152,063 | |
| Total tons milled, 1914..... | | | | 743,531 | |

At the Buffalo mine the cyanide plant, which forms part of the low grade mill, treated 9,105 tons of slimes, producing 67,429 ounces.

The Cobalt Reduction Mill, which now forms part of the Mining Corporation of Canada, Ltd., has been extended by the addition of a cyanide plant for the treatment of slimes doing away with the use of vanners.

At the Dominion Reduction Mill, besides the silver bullion there were produced 1,764 tons of amalgamation residues, which were shipped to the smelters.

In the O'Brien Mill the jig concentrates contained 139,022 ounces and the table concentrates 278,045 ounces. The tailings from the concentrating tables amounting to 51,606 tons were cyanided, and produced 448,720 fine ounces silver.

The Buffalo High Grade Mill treats the concentrates from the Low Grade Mill, as well as metalics, and hand picked raw ore from the mines.

The residues from this mill have been stored for a possible further treatment for the nickel, cobalt, and other valuable constituents.

They have already been re-treated and the mercury extracted that was taken up in the amalgamation process used for the extraction of the silver. The mill treated 14 tons of raw ore and 792 tons of concentrates and metalics, producing 930,551 fine ounces in bullion.

The Nipissing High Grade Mill treated 1,885 tons, containing 4,454,180 ounces, and shipped 1,238 tons of residues, most of which was shipped to Birmingham, England, the value being in the cobalt contents.

British Columbia.

The chief sources of the silver production in this Province are the silver-lead ores of the East and West Kootenays, supplemented by the silver contained in the gold-copper ores of Rossland, the Boundary, and Coast districts. The production in 1914 based on smelter recoveries, was 3,159,897 ounces, valued at \$1,731,971.

The leading silver producers of the Province, in order of importance were: Silver-lead mines—the Standard, Sullivan, Number One, Rambler-Cariboo, Silver Standard, Vancouver, Silver King, Slocan Star, and Blue Bell.

Among the copper-gold mines might be mentioned the Granby, at Phoenix, Hidden Creek at Anyox, and the Centre Star-Le Roi and Le Roi No. 2 groups in Rossland.

In the Minister of Mines Report for British Columbia, for 1914, it is stated that, "The Slocan District, including the Ainsworth, Slocan, Slocan City and Trout Lake Mining Divisions—produced about 59 per cent of the total provincial output of silver this year, and the Fort Steele Mining Division about 13.7 per cent, all from argentiferous galena. The remainder is chiefly derived from the smelting of copper ores carrying silver."

"The Slocan, and Slocan City Divisions, alone produced about 49.4 per cent."

The production of silver by districts, as reported by the Minister of Mines, is shown in the following table:—

Production of Silver in British Columbia by Districts, 1909-1914.*

(Silver Contents of Ores shipped.)

| | 1910. | 1911. | 1912. | 1913. | 1914. |
|--------------------------------|-----------|-----------|-----------|-----------|-----------|
| | Ozs. | Ozs. | Ozs. | Ozs. | Ozs. |
| Cariboo— | | | | | |
| Omineca division..... | | | | 46,298 | 135,265 |
| Cassiar..... | 1,454 | 29,976 | 5,868 | 4,714 | 131,509 |
| Kootenay, East— | | | | | |
| Fort Steele division..... | 501,475 | 330,235 | 376,918 | 362,311 | 492,080 |
| Other divisions..... | 243 | | 7,405 | 4,756 | |
| Kootenay, West— | | | | | |
| Ainsworth division..... | 233,010 | 77,375 | 301,755 | 447,015 | 329,586 |
| Nelson division..... | 45,787 | 76,774 | 164,182 | 129,011 | 150,268 |
| Slocan division..... | 964,634 | 793,926 | 1,657,105 | 1,841,226 | 1,775,975 |
| Trail Creek division..... | 87,833 | 88,076 | 87,530 | 109,585 | 136,185 |
| Other divisions..... | 107,753 | 67,884 | 43,536 | 23,397 | 11,757 |
| Yale— | | | | | |
| Boundary..... | 460,945 | 326,849 | 389,341 | 394,048 | 347,981 |
| Yale division..... | 3 | 343 | | 461 | |
| Coast and other districts..... | 47,104 | 100,926 | 98,468 | 103,034 | 91,574 |
| Total..... | 2,450,241 | 1,892,364 | 3,132,108 | 3,465,856 | 3,602,180 |

*From the Minister of Mines Reports, British Columbia.

Yukon.

The figures of the silver production of the Yukon given in the following table represent the silver alloyed with the placer gold, together with a small amount from the lode mines of the district. On an average about one ounce of silver is contained in each five ounces of crude bullion from the alluvial workings.

The production may be given as follows:—

Annual Production of Silver in the Yukon District.

| | Placer | Value. | Lode | Value. | Total | Value. |
|-----------|--------|--------|--------|--------|---------|--------|
| | ozs. | | ozs. | | ozs. | |
| | | \$ | | \$ | | \$ |
| 1909..... | 45,000 | 23,176 | | | 45,000 | 23,176 |
| 1910..... | 50,000 | 26,743 | 37,418 | 20,013 | 87,418 | 46,756 |
| 1911..... | 50,300 | 26,812 | 62,408 | 33,206 | 112,708 | 60,078 |
| 1912..... | 60,302 | 36,685 | 20,766 | 12,633 | 81,068 | 49,318 |
| 1913..... | 63,522 | 37,980 | 24,104 | 14,412 | 87,626 | 52,392 |
| 1914..... | 55,744 | 30,554 | 37,229 | 20,405 | 92,973 | 50,959 |

TIN.

Tin ores have not yet been found in sufficient quantities in Canada to be of economic importance.

The occurrence of tin ore has been reported from several localities, the most important, perhaps, being the discovery of cassiterite, near New Ross, Lunenburg county, Nova Scotia. Reports upon it may be found in the Summary Reports of the Geological Survey Branch of the Department of Mines, for 1907, 1908, 1910, 1911, and 1912.

Tin in Black Sands.

During 1913 a sample shipment of one ton of black sand was made from the Atlin district of British Columbia, which is reported to have assayed 6.71 per cent tin. The black sand was obtained from alluvial sluice boxes in this camp. Stream tin has also been found in some of the Yukon placer deposits and a small quantity, recovered in the gold dredging operations, is reported to have been marketed, though no direct returns of production have been obtained.

The imports of tin in 1914 included tin in blocks, pigs and bars 3,382,700 pounds valued at \$1,191,466; tin foil 1,244,628 pounds valued at \$173,088; tin crystals valued at \$7,759; and tinware and manufactures of tin valued at \$650,987.

There is also a large annual import of "tin plate," the quantity and value in 1914 being 101,581,800 pounds, valued at \$3,151,385.

The annual imports of tin since 1910 are shown herewith.

Annual Imports of Tin.

| Calendar Year. | Tin in blocks, pigs and bars. | | Tin foil. | | (a) Tinware, etc. | Tin crystals. | Bichloride of tin. | |
|----------------|-------------------------------|--------------|-----------|--------------|-------------------------|------------------|-----------------------|--------------|
| | Pounds. | Value. \$ | Pounds. | Value. \$ | Value. \$ | Value. \$ | Pounds. | Value. \$ |
| 1910..... | 3,231,100 | 1,058,778 | 866,751 | 114,602 | 389,040 | 3,903 | 31,219 | 3,846 |
| 1911..... | 4,047,500 | 1,623,670 | 1,531,877 | 176,602 | 461,029 | 4,370 | 25,797 | 3,876 |
| 1912..... | 4,894,700 | 2,134,221 | 1,316,882 | 183,707 | 540,599 | 6,308 | 36,045 | 5,595 |
| 1913..... | 5,085,700 | 2,252,324 | 1,074,131 | 188,779 | 667,158 | 8,077 | 19,114 | 2,422 |
| 1914..... | 3,382,700 | 1,191,466 | 1,244,628 | 173,088 | 650,987 | 7,759 | 200 | 29 |

(a) Tinware, plain, japanned or lithographed, and all manufactures of tin n.e.s.

Prices:—The price of tin in New York was about 50 cents per pound in January of 1913 but contraction in consumption caused a gradual decline throughout the year. In January 1914 the price of tin was 37.779 cents per pound, and raised to 39.830 cents in February, decreasing to 30.284 cents in October, and increasing again to 33.601 in December.

TUNGSTEN.

No production of tungsten is reported during 1914.

Scheelite was discovered in Halifax county, Nova Scotia, in 1908. Mr. Faribault, of the Geological Survey, visited this deposit again in 1909, and a preliminary report thereon will be found in the Summary Report of the Geological Survey for 1909, pages 228 to 234. During 1910 and 1912 these deposits were developed by the Scheelite Mines, Limited, who constructed a mill and made a shipment of 14 tons of tungsten concentrates—the first shipment from Nova Scotia—carrying 72 per cent tungstic acid.

The occurrence of wolframite has also been noted in association with molybdenite, by Dr. Walker, in New Brunswick, near the confluence of Burnt Hill brook and southwest Miramichi river. The property was tested by Mr. Freeze, of Doaktown, New Brunswick, and Mr. Matthew Lodge, of Moncton, who formed the Acadia Tungsten Mines Company. This Company has done a little development.

Prices:—"During the first 7 months of 1914, the price of tungsten was about \$0.67 per pound. Since the war lots for immediate shipment have sold as high as \$1.35 per pound."—(Engineering & Mining Journal).

ZINC.

The production of zinc ore in Canada in 1914, as obtained by direct returns from producers, was 10,893 tons, valued at \$262,563, the greater part being from British Columbia. The zinc content of these shipments was returned as 9,101,460 pounds, which, if valued at the average New York price of spelter during the year, 5·213 cents, would be worth \$474,459.

The ore shipped from British Columbia contains also a varying silver content, for which payment is made by the smelters, and without which, on account of the import duty to the United States and the long rail haul, it would not in many cases pay to ship.

The British Columbia shipments were heavy as a result of the activity of the Slocan mines and mills. There were also shipments from Notre Dame des Anges, Portneuf county, Quebec.

During 1913 the new United States customs tariff came into effect, considerably reducing the duties payable on Canadian ores, the new items affecting Canadian shipments being:—

Zinc ores containing 25 per cent or more zinc: 10 per cent on zinc contained therein.

Lead bearing ore: $\frac{3}{4}$ cent per pound on lead contained therein.

Although not paid for by the United States smelters, the lead in ore is considered as dutiable and as there is often a small lead content in the zinc ore or concentrates shipped, the lead duty applies. The result of the decreased duties has been a considerable increase in zinc shipments.

During 1914 there were received at American smelting works from Canadian mines 12,171·5 tons of zinc concentrates, containing 10,008,478 pounds of zinc.

In 1913 these works reported the receipt of 7,074 tons containing 5,941,727 pounds of zinc; and in 1912, 7,190 tons containing 6,393,983 pounds of zinc.

Statistics of the production of zinc since 1898 are given in the following table:—

Annual Production of Zinc.

| Calendar Year. | ZINC ORE SHIPPED. | | METALLIC ZINC IN ORE SHIPPED. | |
|----------------|-------------------|-------------|-------------------------------|--------------|
| | Tons. | Spot value. | Lbs. | Final value. |
| | | \$ | | \$ |
| 1898..... | 1,162 | 11,000 | 788,000 | 36,011 |
| 1899..... | 865 | 18,165 | 814,000 | 46,805 |
| 1900..... | 261 | 4,810 | 212,000 | 9,342 |
| 1901..... | 158 | 1,659 | 142,200 | 6,882 |
| 1902..... | 1,000 | 10,500 | 900,000 | 48,660 |
| 1903..... | 597 | 3,700 | 477,568 | 24,256 |
| 1904..... | 9,413 | 139,200 | * | * |
| 1905..... | 1,154 | 23,800 | * | * |
| 1906..... | 1,573 | 49,100 | * | * |
| 1907..... | 452 | 3,215 | * | * |
| 1908..... | 18,371 | 242,699 | 16,468,204 | 906,245 |
| 1909 (a)..... | 5,063 | 120,003 | 4,361,712 | 240,766 |
| 1910..... | 2,590 | 101,072 | 2,346,849 | 135,132 |
| 1911..... | 6,415 | 215,149 | 5,354,700 | 371,777 |
| 1912..... | 7,889 | 186,827 | 7,069,800 | 399,302 |
| 1913..... | 10,893 | 262,563 | 9,101,460 | 474,459 |
| 1914..... | | | | |

*Figures not available.

(a) Includes 7,424 tons shipped late in 1908.

The imports of zinc, taken as an index of consumption, show a fairly steady increase. The total imports of zinc in blocks and pigs and spelter, were in 1880 some 744 tons; in 1889 they had risen to 1,427 tons and remained fairly stationary the next ten years. In 1899 they were 1,213 tons and rose to 4,110 for the fiscal year 1909.

During the calendar year 1914 the imports were 7,003 tons valued at \$740,816, in addition to which there were 4,723 tons zinc white valued at \$389,796, zinc manufactures to the value of \$36,355; also zinc dust 181 tons valued at \$34,295; and sulphate and chloride of zinc 176 tons valued at \$9,390.

The imports are given, in detail, in the following tables:—

Imports of Zinc in Blocks, Pigs, and Sheets.

| Fiscal Year. | Cwt. | Value | Fiscal Year. | Cwt. | Value | Fiscal Year. | Cwt. | Value. |
|--------------|--------|---------|--------------|--------|---------|----------------|---------|---------|
| | | \$ | | | \$ | | | \$ |
| 1880..... | 13,805 | 67,881 | 1892..... | 21,881 | 127,302 | 1904..... | 25,553 | 138,057 |
| 1881..... | 20,920 | 94,015 | 1893..... | 26,446 | 124,360 | 1905..... | 25,141 | 141,514 |
| 1882..... | 15,021 | 76,631 | 1894..... | 20,774 | 90,680 | 1906..... | 24,462 | 158,438 |
| 1883..... | 22,765 | 94,799 | 1895..... | 15,061 | 63,373 | 1907 (9 mos.) | 18,427 | 126,221 |
| 1884..... | 18,945 | 77,373 | 1896..... | 20,223 | 80,784 | 1908..... | 30,362 | 191,081 |
| 1885..... | 20,954 | 70,598 | 1897..... | 11,946 | 57,754 | 1909..... | 26,222 | 141,066 |
| 1886..... | 23,146 | 85,599 | 1898..... | 35,148 | 112,785 | Calendar Year: | | |
| 1887..... | 26,142 | 98,557 | 1899..... | 18,785 | 107,477 | 1910..... | 31,660 | 191,051 |
| 1888..... | 16,407 | 65,827 | 1900..... | 28,748 | 156,167 | 1911..... | 33,678 | 206,859 |
| 1889..... | 19,782 | 83,935 | 1901..... | 20,527 | 103,457 | 1912..... | 100,095 | 617,836 |
| 1890..... | 18,236 | 92,530 | 1902..... | 34,871 | 141,560 | 1913..... | 47,226 | 291,368 |
| 1891..... | 17,984 | 105,023 | 1903..... | 26,646 | 142,827 | 1914..... | 31,609 | 189,785 |

Imports of Spelter.*

| Fiscal Year. | Cwt. | Value. | Fiscal Year. | Cwt. | Value. | Fiscal Year. | Cwt. | Value. |
|--------------|--------|--------|--------------|--------|---------|----------------|---------|---------|
| | | \$ | | | \$ | | | \$ |
| 1880..... | 1,073 | 5,301 | 1892..... | 13,909 | 62,550 | 1904..... | 33,952 | 164,751 |
| 1881..... | 2,904 | 12,276 | 1893..... | 10,721 | 49,822 | 1905..... | 37,941 | 206,244 |
| 1882..... | 1,654 | 7,779 | 1894..... | 8,423 | 35,615 | 1906..... | 50,137 | 290,686 |
| 1883..... | 1,274 | 5,196 | 1895..... | 9,249 | 30,245 | 1907 (9 mos.) | 42,465 | 269,044 |
| 1884..... | 2,239 | 10,417 | 1896..... | 10,897 | 40,548 | 1908..... | 65,593 | 314,369 |
| 1885..... | 3,325 | 10,875 | 1897..... | 8,342 | 32,826 | 1909..... | 55,981 | 310,688 |
| 1886..... | 5,432 | 18,238 | 1898..... | 2,794 | 13,561 | Calendar Year: | | |
| 1887..... | 6,908 | 25,007 | 1899..... | 5,450 | 29,687 | 1910..... | 109,084 | 561,170 |
| 1888..... | 7,772 | 29,762 | 1900..... | 5,836 | 29,416 | 1911..... | 116,996 | 654,097 |
| 1889..... | 8,750 | 37,403 | 1901..... | 14,621 | 58,283 | 1912..... | 117,845 | 686,585 |
| 1890..... | 14,570 | 71,122 | 1902..... | 18,356 | 80,757 | 1913..... | 126,051 | 661,207 |
| 1891..... | 6,249 | 31,459 | 1903..... | 23,159 | 110,817 | 1914..... | 108,454 | 551,031 |

*Spelter in blocks and pigs.

Imports of Manufactures of Zinc.

| Fiscal Year | Value. | Fiscal Year. | Value. | Fiscal Year. | Value. |
|-------------|--------|--------------|--------|--------------------|--------|
| | \$ | | \$ | | \$ |
| 1880..... | 8,327 | 1892..... | 7,563 | 1904..... | 12,682 |
| 1881..... | 20,178 | 1893..... | 7,464 | 1905..... | 11,912 |
| 1882..... | 15,526 | 1894..... | 6,193 | 1906..... | 12,917 |
| 1883..... | 22,599 | 1895..... | 5,581 | 1907 (9 mos.)..... | 12,556 |
| 1884..... | 11,952 | 1896..... | 6,290 | 1908..... | 19,240 |
| 1885..... | 9,459 | 1897..... | 5,145 | 1909..... | 15,621 |
| 1886..... | 7,345 | 1898..... | 10,503 | Calendar Year: | |
| 1887..... | 6,561 | 1899..... | 14,661 | 1910..... | 21,829 |
| 1888..... | 7,402 | 1900..... | 11,475 | 1911..... | 30,862 |
| 1889..... | 7,233 | 1901..... | 6,882 | 1912..... | 46,336 |
| 1890..... | 6,472 | 1902..... | 6,683 | 1913..... | 54,898 |
| 1891..... | 7,178 | 1903..... | 9,754 | 1914..... | 36,355 |

Imports of Zinc White, Zinc Dust, and Zinc Sulphate and Chloride.

| Calendar Year. | Zinc white. | | Zinc Dust. | | Zinc Sulphate and Chloride. | |
|----------------|-------------|---------|------------|--------|-----------------------------|--------|
| | Pounds. | Value. | Pounds. | Value. | Pounds. | Value. |
| | | \$ | | \$ | | \$ |
| 1910..... | 8,496,399 | 312,779 | 97,461 | 4,859 | 237,466 | 6,470 |
| 1911..... | 8,537,498 | 314,194 | 86,242 | 5,718 | 414,500 | 15,930 |
| 1912..... | 10,505,944 | 425,714 | 308,239 | 18,944 | 941,780 | 29,104 |
| 1913..... | 12,682,126 | 525,643 | 412,294 | 26,403 | 634,634 | 17,424 |
| 1914..... | 9,445,397 | 389,796 | 362,109 | 34,295 | 352,715 | 9,390 |

Average Price of Spelter in Cents per Pound at New York.*

| Month. | 1904. | 1905. | 1906. | 1907. | 1908. | 1909. | 1910. | 1911. | 1912. | 1913. | 1914. |
|----------------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| January..... | 4-863 | 6-190 | 6-487 | 6-732 | 4-513 | 5-141 | 6-101 | 5-452 | 6-442 | 6-931 | 5-262 |
| February..... | 4-916 | 6-139 | 6-075 | 6-814 | 4-785 | 4-889 | 5-569 | 5-518 | 6-499 | 6-239 | 5-377 |
| March..... | 5-057 | 6-067 | 6-209 | 6-837 | 4-665 | 4-757 | 5-637 | 5-563 | 6-626 | 6-078 | 5-250 |
| April..... | 5-219 | 5-817 | 6-087 | 6-687 | 4-645 | 4-965 | 5-439 | 5-399 | 6-633 | 5-641 | 5-113 |
| May..... | 5-031 | 5-434 | 5-997 | 6-441 | 4-608 | 5-124 | 5-191 | 5-348 | 6-679 | 5-406 | 5-074 |
| June..... | 4-760 | 5-190 | 6-096 | 6-419 | 4-543 | 5-402 | 5-128 | 5-520 | 6-877 | 5-124 | 5-000 |
| July..... | 4-873 | 5-396 | 6-006 | 6-072 | 4-485 | 5-402 | 5-152 | 5-695 | 7-116 | 5-278 | 4-920 |
| August..... | 4-866 | 5-706 | 6-027 | 5-701 | 4-702 | 5-729 | 5-279 | 5-953 | 7-028 | 5-658 | 5-568 |
| September..... | 5-046 | 5-887 | 6-216 | 5-236 | 4-769 | 5-796 | 5-514 | 5-869 | 7-454 | 5-694 | 5-380 |
| October..... | 5-181 | 6-087 | 6-222 | 5-430 | 4-801 | 6-199 | 5-628 | 6-102 | 7-426 | 5-340 | 4-909 |
| November..... | 5-513 | 6-145 | 6-375 | 4-925 | 5-059 | 6-381 | 5-976 | 6-380 | 7-371 | 5-229 | 5-112 |
| December..... | 5-872 | 6-522 | 6-593 | 4-254 | 5-137 | 6-249 | 5-624 | 6-301 | 7-162 | 5-154 | 5-592 |
| Year..... | 5-100 | 5-822 | 6-198 | 5-962 | 4-726 | 5-503 | 5-520 | 5-758 | 6-943 | 5-648 | 5-213 |

*From the Engineering and Mining Journal, N.Y.

Average Prices of Spelter, Ordinary Brands, in London.*

| Month. | 1905. | | | 1906. | | | 1907. | | | 1908. | | | 1909. | | |
|----------------|-------|----|----|-------|----|----|-------|----|----|-------|----|----|-------|----|----|
| | £ | s. | d. | £ | s. | d. | £ | s. | d. | £ | s. | d. | £ | s. | d. |
| January..... | 24 | 19 | 9 | 28 | 8 | 2 | 27 | 7 | 1 | 20 | 6 | 3 | 21 | 6 | 3 |
| February..... | 24 | 10 | 6 | 26 | 2 | 4 | 26 | 1 | 5 | 21 | 0 | 7 | 21 | 8 | 9 |
| March..... | 23 | 13 | 6 | 24 | 15 | 3 | 26 | 4 | 8 | 21 | 1 | 5 | 21 | 8 | 8 |
| April..... | 23 | 14 | 3 | 25 | 19 | 3 | 25 | 17 | 5 | 21 | 6 | 1 | 21 | 10 | 1 |
| May..... | 23 | 11 | 8 | 27 | 0 | 2 | 25 | 14 | 2 | 20 | 2 | 10 | 21 | 19 | 1 |
| June..... | 23 | 16 | 8 | 27 | 9 | 9 | 24 | 10 | 2 | 19 | 2 | 2 | 21 | 19 | 11 |
| July..... | 23 | 19 | 6 | 26 | 15 | 11 | 23 | 18 | 11 | 18 | 14 | 1 | 21 | 18 | 9 |
| August..... | 24 | 14 | 6 | 27 | 0 | 5 | 22 | 1 | 7 | 19 | 6 | 9 | 22 | 0 | 3 |
| September..... | 26 | 8 | 3 | 27 | 12 | 5 | 21 | 0 | 11 | 19 | 10 | 3 | 22 | 17 | 1 |
| October..... | 28 | 1 | 7 | 27 | 18 | 10 | 21 | 12 | 11 | 19 | 15 | 1 | 23 | 3 | 4 |
| November..... | 28 | 5 | 11 | 27 | 15 | 1 | 21 | 8 | 4 | 20 | 17 | 1 | 23 | 2 | 1 |
| December..... | 28 | 14 | 11 | 27 | 19 | 3 | 20 | 3 | 3 | 20 | 19 | 2 | 23 | 1 | 3 |
| Year..... | 25 | 7 | 7 | 27 | 1 | 5 | 23 | 16 | 9 | 20 | 3 | 6 | 22 | 2 | 11 |

| Month. | 1910. | | | 1911. | | | 1912. | | | 1913. | | | 1914. | | |
|----------------|-------|----|----|-------|----|----|-------|----|----|-------|----|----|-------|----|----|
| | £ | s. | d. | £ | s. | d. | £ | s. | d. | £ | s. | d. | £ | s. | d. |
| January..... | 23 | 4 | 3 | 23 | 16 | 7 | 26 | 9 | 11 | 25 | 19 | 1 | 21 | 6 | 6 |
| February..... | 23 | 3 | 1 | 23 | 3 | 10 | 26 | 6 | 5 | 25 | 4 | 3 | 21 | 7 | 6 |
| March..... | 23 | 3 | 7 | 22 | 19 | 2 | 25 | 19 | 11 | 24 | 11 | 4 | 21 | 7 | 7 |
| April..... | 22 | 9 | 11 | 23 | 13 | 8 | 25 | 8 | 11 | 25 | 2 | 4 | 21 | 10 | 2 |
| May..... | 22 | 1 | 1 | 24 | 6 | 1 | 25 | 11 | 2 | 24 | 10 | 4 | 21 | 5 | 9 |
| June..... | 22 | 3 | 2 | 24 | 9 | 7 | 25 | 11 | 11 | 21 | 19 | 10 | 21 | 6 | 0 |
| July..... | 22 | 5 | 6 | 24 | 13 | 10 | 25 | 13 | 1 | 20 | 11 | 2 | 21 | 6 | 7 |
| August..... | 22 | 14 | 0 | 26 | 11 | 2 | 26 | 1 | 2 | 20 | 14 | 0 | 29 | 0 | 9 |
| September..... | 23 | 2 | 7 | 27 | 12 | 7 | 26 | 17 | 0 | 21 | 3 | 10 | 25 | 14 | 0 |
| October..... | 23 | 16 | 6 | 27 | 4 | 10 | 27 | 5 | 10 | 20 | 13 | 9 | 23 | 13 | 6 |
| November..... | 24 | 1 | 9 | 26 | 13 | 2 | 26 | 14 | 3 | 20 | 14 | 4 | 24 | 14 | 10 |
| December..... | 23 | 17 | 7 | 26 | 13 | 7 | 26 | 0 | 4 | 21 | 6 | 8 | 27 | 6 | 10 |
| Year..... | 23 | 0 | 0 | 25 | 3 | 2 | 26 | 3 | 3 | 22 | 14 | 3 | 23 | 6 | 8 |

* From the annual publication of the "Metal Information Bureau," London, E.C.

World's Production of Spelter in Short Tons.*

| Country. | 1908. | 1909. | 1910. | 1911. | 1912. | 1913. |
|-------------------------|---------|---------|---------|---------|-----------|-----------|
| Australia | 1,198 | ..... | 560 | 1,904 | 2,531 | 4,105 |
| Austria and Italy | 14,063 | 13,931 | 14,666 | 18,602 | 21,609 | 23,928 |
| Belgium | 181,851 | 184,194 | 190,233 | 215,050 | 220,678 | 217,928 |
| France and Spain | 61,512 | 61,859 | 65,191 | 70,791 | 79,543 | 78,289 |
| Germany | 239,062 | 242,594 | 251,046 | 276,008 | 298,794 | 312,075 |
| Great Britain | 60,029 | 65,422 | 69,531 | 73,803 | 63,086 | 65,197 |
| Holland | 19,017 | 21,548 | 23,121 | 25,059 | 26,380 | 26,811 |
| Poland | 9,740 | 8,758 | 9,514 | 10,952 | 9,659 | 8,389 |
| United States | 210,424 | 255,760 | 269,184 | 286,526 | 338,806 | 346,676 |
| Norway ..... | ..... | ..... | ..... | 7,363 | 8,959 | 10,237 |
| Total | 796,896 | 854,066 | 893,046 | 986,058 | 1,070,045 | 1,093,635 |

*Mineral Resources of the United States.

World's Consumption of Spelter in Short Tons.*

| Country. | 1908. | 1909. | 1910. | 1911. | 1912. | 1913. |
|-----------------------|---------|---------|---------|-----------|-----------|-----------|
| Austria-Hungary | 35,935 | 36,155 | 37,258 | 47,950 | 51,588 | 44,533 |
| Belgium | 74,956 | 71,209 | 84,326 | 81,240 | 85,098 | 84,216 |
| France | 85,869 | 73,744 | 62,059 | 90,389 | 90,389 | 89,286 |
| Germany | 198,634 | 207,343 | 203,374 | 241,734 | 248,899 | 255,734 |
| Great Britain | 152,669 | 171,408 | 195,989 | 193,674 | 204,146 | 214,508 |
| Holland | 4,189 | 4,409 | 4,409 | 4,409 | 4,409 | 4,409 |
| Italy | 9,259 | 9,039 | 8,929 | 11,133 | 11,795 | 12,015 |
| Russia | 19,621 | 20,282 | 27,447 | 31,856 | 30,754 | 36,707 |
| Spain | 5,512 | 4,960 | 4,630 | 5,291 | 5,181 | 6,503 |
| United States | 214,167 | 270,730 | 245,884 | 280,059 | 340,372 | 295,370 |
| Other countries | 11,023 | 9,921 | 13,669 | 19,621 | 21,715 | 23,038 |
| Total | 811,834 | 879,200 | 887,974 | 1,007,356 | 1,094,346 | 1,066,319 |

*Mineral Resources of the United States

NON-METALLIC PRODUCTS.

¹A recent publication of the Mines Branch of the Department of Mines, gives a collection of interesting data with regard to the non-metallic minerals used in Canadian manufacturing industries, indicating the sources of these non-metallic minerals, and the various uses to which they are put.

ABRASIVES.

The abrasives produced in Canada are: corundum, the various sandstone abrasives, as grindstones, pulpstones, scythestones, etc., and tripolite, or infusorial earth.

CORUNDUM.

The 1914 production of grain corundum was the lowest since 1901 amounting to only 1,095,500 pounds, valued at \$72,176, or an average price of 6.59 cents per pound. This is less than half of the 1913 production, which was 2,353,845 pounds, valued at \$137,036, or an average of 5.8 cents per pound. Sales in Canada were 26,800 pounds or 2.4 per cent, and sales for export were 1,068,700 pounds or 97.6 per cent of the year's production.

Grain corundum to the amount of 1,389,700 pounds was recovered from 12,111 tons of rock milled, a recovery of 5.7 per cent. The recovery in 1913 was 6.2 per cent, and in 1912 it was 4.4 per cent. The recovery of corundum during the earlier years of the industry was about 10 per cent, but during recent years has fallen as low as 3.9 per cent, a much lower grade of rock being now milled than heretofore.

Statistics concerning the annual production are given in the following table:—

Production of Corundum Ore and Corundum.

| Cal- endar Year. | Corundum- bearing rock treated. | Grain corundum graded. | Grain. corundum sold in Canada. | Grain corundum exported. | Total of grain corundum. | Value. | Average price. |
|------------------------|--|------------------------------|--|--------------------------------|--------------------------------|---------|-------------------|
| | Tons. | Tons. | Tons. | Tons. | Tons. | \$ | Cts. |
| 1900..... | | 60 | 3 | | 3 | 300 | 5.00 |
| 1901..... | 4,134 | 444 | 85 | 302 | 387 | 46,415 | 5.97 |
| 1902..... | 7,996 | 806 | 106 | 662 | 768 | 84,465 | 5.49 |
| 1903..... (a) | 8,877 | 839 | 85 | 618 | 703 | 77,510 | 5.51 |
| 1904..... | 28,187 | 1,654 | 116 | 877 | 993 | 109,545 | 5.51 |
| 1905..... | 23,571 | 1,681 | 140 | 1,504 | 1,644 | 149,153 | 4.48 |
| 1906..... | 45,719 | 2,914 | 162 | 2,112 | 2,274 | 204,973 | 4.50 |
| 1907..... | 60,532 | 2,682 | 164 | 1,728 | 1,892 | 177,922 | 4.70 |
| 1908..... | 2,678 | 106 | 99 | 990 | 1,089 | 100,398 | 4.60 |
| 1909..... | 35,894 | 1,579 | 129 | 1,362 | 1,491 | 162,492 | 5.45 |
| 1910..... | 37,183 | 1,686 | 106 | 1,764 | 1,870 | 198,680 | 5.31 |
| 1911..... | 41,795 | 1,641 | 92 | 1,380 | 1,472 | 161,873 | 5.50 |
| 1912..... | 36,879 | 1,620 | 63 | 1,897 | 1,960 | 239,091 | 6.10 |
| 1913..... | 12,290 | 763 | 23 | 1,154 | 1,177 | 137,036 | 5.82 |
| 1914..... | 12,111 | 695 | 14 | 534 | 548 | 72,176 | 6.59 |

(a) In addition to this amount which was milled in Canada, 267 tons of ore were mined and shipped to the United States for treatment there.

¹ "Non-Metallic Minerals in Canadian Manufacturing," Frechette, Mines Branch, Department of Mines, Ottawa, 1914, No. 305.

Corundum is found in an area embracing several townships in Renfrew and Hastings counties in the Province of Ontario. The industry made its appearance there in 1900, the production reaching a maximum in 1906. From 1907 to 1913 the yearly production was smaller but fairly uniform.

The Manufacturers Corundum Company has been the only operator for the last five years, and for 1914 it reports only one of its properties operating.

Only a small proportion of the graded grain corundum is sold in Canada. The balance goes to the United States, Great Britain, France, and Germany.

Those desiring detailed information concerning the mines and mills of the corundum district can find the same in the Annual Reports of the Ontario Bureau of Mines, and in the Geological Survey publications.¹ The treatment of the corundum-bearing rock consists of crushing, concentration, magnetic separation of the iron, air separation of the mica, and sizing. The magnetic sand now finds a sale for use in the manufacture of school black-boards.

GRINDSTONES, PULPSTONES, ETC.

The total production of grindstones, pulpstones, and scythestones for 1914 was 3,976 tons, valued at \$54,504, as compared with a production in 1913 of 4,837 tons, valued at \$51,325, which is a decrease of 17 per cent in tonnage, but an increase of about 5 per cent in value.

The production as usual, was confined to Nova Scotia and New Brunswick. Reports were made by five operating companies, the quarries operated being at Mic Mac Point and Quarry Island, Pictou county, N.S., at Stonehaven and Clifton, Gloucester county, at Quarryville, Northumberland county, and at Woodpoint, Westmorland county, N.B.

The grindstones are shipped chiefly in the finished condition, and are marketed in Canada, Newfoundland, and the United States, the price realized being around \$12 to \$13 per ton. The number of pulpstones sold to Canadian pulp mills was the same as last year, but the price realized was slightly greater. These stones average about $2\frac{1}{2}$ tons in weight. The weight of scythestones, both finished and in the rough, shipped during the year was approximately 153 tons. One quarry shipped 38 tons of grit for marble polishing.

The output of pulpstones comes from The Miramichi Quarry Company's property at Quarryville, Northumberland county, N.B. The operators claim "that Miramichi pulp grinding stones are fully equal to the best imported" and that they have many customers whom they have been supplying regularly for years. The Company's most important product is an excellent building stone for which a market is being built up in Ontario and Quebec.

¹ "The Geology of the Haliburton and Bancroft Area," Adams, Geol. Sur. Can., Memoir No. 6.
"Corundum, Its Occurrence, Distribution, Exploitation and Uses." Barlow, Geol. Sur. Can., Memoir No. 57.

A table showing the production of grindstones by provinces since 1886 follows.

Annual Production of Grindstones.

| Calendar Year. | NOVA SCOTIA. | | NEW BRUNSWICK. | | TOTAL. | | Average value per ton. |
|----------------|--------------|--------|----------------|--------|--------|--------|------------------------|
| | Tons. | Value. | Tons. | Value. | Tons. | Value. | |
| | | \$ | | \$ | | \$ | \$ |
| 1886..... | 1,765 | 24,050 | 2,255 | 22,495 | 4,020 | 46,545 | 11 58 |
| 1887..... | 1,710 | 25,020 | 3,582 | 38,988 | 5,292 | 64,008 | 12 10 |
| 1888..... | 1,971 | 20,400 | 3,793 | 30,739 | 5,764 | 51,129 | 8 87 |
| 1889..... | 712 | 7,128 | 2,692 | 23,735 | 3,404 | 30,863 | 9 07 |
| 1890..... | 850 | 8,536 | 4,034 | 33,804 | 4,884 | 42,340 | 8 67 |
| 1891..... | 1,980 | 19,800 | 2,499 | 22,787 | 4,479 | 42,587 | 9 51 |
| 1892..... | 2,462 | 27,610 | 2,821 | 23,577 | 5,283 | 51,187 | 9 69 |
| 1893..... | 2,112 | 21,000 | 2,488 | 17,379 | 4,600 | 38,379 | 8 34 |
| 1894..... | 2,128 | 16,000 | 1,629 | 16,717 | 3,757 | 32,717 | 8 71 |
| 1895..... | 1,400 | 14,000 | 2,075 | 17,932 | 3,475 | 31,932 | 9 19 |
| 1896..... | 1,450 | 14,500 | 2,263 | 18,810 | 3,713 | 33,310 | 8 97 |
| 1897..... | 1,407 | 17,500 | 3,165 | 24,840 | 4,572 | 42,340 | 9 26 |
| 1898..... | 1,422 | 12,350 | 3,513 | 32,425 | 4,935 | 44,775 | 9 07 |
| 1899..... | 1,378 | 10,300 | 3,133 | 32,965 | 4,511 | 43,265 | 9 59 |
| 1900..... | 1,411 | 12,600 | 4,128 | 40,850 | 5,539 | 53,450 | 9 65 |
| 1901..... | 358 | 3,200 | 4,223 | 42,490 | 4,581 | 45,690 | 9 97 |
| 1902..... | 1,074 | 8,118 | 3,559 | 36,000 | 4,633 | 44,118 | 9 52 |
| 1903..... | 1,337 | 9,562 | 4,201 | 38,740 | 5,538 | 48,302 | 8 72 |
| 1904..... | 1,029 | 7,332 | 3,620 | 35,450 | 4,649 | 42,782 | 9 20 |
| 1905..... | 1,020 | 10,200 | 4,520 | 52,175 | 5,540 | 62,375 | 11 25 |
| 1906..... | 1,023 | 9,680 | 4,340 | 50,134 | 5,363 | 59,814 | 11 15 |
| 1907..... | 551 | 4,480 | 4,863 | 55,896 | 5,414 | 60,376 | 11 15 |
| 1908..... | 473 | 4,803 | 3,370 | 43,325 | 3,843 | 48,128 | 12 52 |
| 1909..... | 312 | 3,204 | 3,963 | 51,460 | 4,275 | 54,664 | 12 79 |
| 1910..... | 387 | 3,496 | 3,586 | 43,700 | 3,973 | 47,196 | 11 88 |
| 1911..... | 380 | 3,382 | 4,186 | 49,560 | 4,566 | 52,942 | 11 59 |
| 1912..... | 374 | 3,760 | 4,038 | 48,330 | 4,412 | 52,090 | 11 81 |
| 1913..... | 350 | 4,900 | 4,487 | 46,425 | 4,837 | 51,325 | 10 61 |
| 1914..... | 350 | 5,270 | 3,626 | 49,234 | 3,976 | 54,504 | 13 71 |

The value of exports of grindstones finished and in the rough during the calendar year 1914, according to the records of the Department of Customs, was \$24,407 (finished valued at \$24,413, and rough at \$294) as compared with an export in 1913 of finished stones only valued at \$54,867.

Out of the total 1914 Canadian production of grindstones, valued at \$54,504, the sales in Canada amounted to only approximately \$15,573. To meet Canadian requirements in Ontario and Quebec chiefly there was imported during the same year grindstones to the value of \$98,872, which is a decrease in value of 32 per cent from the 1913 imports. Other abrasives imported during the year were burrstones to the value of \$16; emery \$29,127; manufactures of emery \$88,881; pumice stone \$16,976, sandpaper \$138,415; iron sand for glass or granite polishing, or for sawing stone \$13,743; or a total value, including grindstones, of \$386,030, a decrease in value as compared with 1913, of 27 per cent. In 1913 the imports were: grindstones \$145,247; burrstones \$1,784; emery \$48,995; manufactures of emery \$135,654; pumice stone \$17,861; sandpaper \$171,516; iron sand for glass or granite polishing, or for sawing stone \$10,168, a total value, including grindstones, of \$531,225. In 1912 the value of the imports of abrasives of all kinds was \$515,055.

Tables showing values of exports of grindstones and imports of abrasive materials into Canada follow.

Exports of Grindstones.*

| Calendar Year. | Value. | Calendar Year. | Value. | Calendar Year. | Value. |
|----------------|--------|----------------|--------|----------------|--------|
| | \$ | | \$ | | \$ |
| 1884..... | 28,186 | 1894..... | 12,579 | 1904..... | 35,612 |
| 1885..... | 22,606 | 1895..... | 16,723 | 1905..... | 24,868 |
| 1886..... | 24,185 | 1896..... | 19,139 | 1906..... | 31,978 |
| 1887..... | 28,769 | 1897..... | 18,807 | 1907..... | 32,534 |
| 1888..... | 28,176 | 1898..... | 25,588 | 1908..... | 19,721 |
| 1889..... | 29,982 | 1899..... | 23,288 | 1909..... | 13,942 |
| 1890..... | 18,564 | 1900..... | 42,128 | 1910..... | 23,502 |
| 1891..... | 28,433 | 1901..... | 29,130 | 1911..... | 29,206 |
| 1892..... | 23,567 | 1902..... | 24,489 | 1912..... | 26,535 |
| 1893..... | 21,672 | 1903..... | 27,659 | 1913..... | 54,867 |
| | | | | 1914..... | 24,407 |

* Including stone for the manufacture of grindstones.

Imports of Abrasive Materials.

| Fiscal Year. | Grindstones. Value. | Burrstones (c) Value. | Emery (a) Value. | Mfrs. of emery (b) Value. | Pumice stone. (d) Value. | Iron Sand (e) Value. | Sandpaper. (f) Value. |
|--------------------|------------------------|-----------------------------|------------------------|------------------------------------|-----------------------------------|----------------------------|-----------------------------|
| | \$ | \$ | \$ | \$ | \$ | \$ | \$ |
| 1880..... | 11,714 | 12,049 | | | | | |
| 1881..... | 16,895 | 6,337 | | | | | |
| 1882..... | 30,654 | 15,143 | | | | | |
| 1883..... | 31,456 | 13,242 | | | | | |
| 1884..... | 30,471 | 5,365 | | | | | |
| 1885..... | 16,065 | 4,517 | 5,066 | 4,920 | 9,384 | | |
| 1886..... | 12,803 | 4,062 | 11,877 | 5,832 | 2,777 | | |
| 1887..... | 14,815 | 3,545 | 12,023 | 4,598 | 3,594 | | |
| 1888..... | 18,263 | 4,753 | 15,674 | 4,001 | 2,890 | | |
| 1889..... | 25,564 | 5,465 | 13,565 | 3,948 | 3,232 | | |
| 1890..... | 20,569 | 2,506 | 16,922 | 5,313 | 3,003 | | |
| 1891..... | 16,991 | 2,089 | 16,179 | 6,665 | 3,696 | | |
| 1892..... | 19,761 | 1,464 | 17,782 | 6,492 | 3,282 | | |
| 1893..... | 20,987 | 3,552 | 17,762 | 5,606 | 3,798 | | |
| 1894..... | 24,426 | 3,029 | 14,433 | 2,223 | 4,160 | | |
| 1895..... | 22,834 | 2,172 | 14,569 | 7,775 | 3,609 | | |
| 1896..... | 26,561 | 2,049 | 16,287 | 11,913 | 3,721 | | |
| 1897..... | 25,547 | 1,827 | 16,318 | 11,231 | 2,903 | | |
| 1898..... | 22,217 | 1,813 | 17,661 | 15,478 | 3,829 | | |
| 1899..... | 27,476 | 1,759 | 21,454 | 22,343 | 5,973 | | |
| 1900..... | 34,382 | 1,546 | 19,312 | 25,615 | 5,604 | | |
| 1901..... | 39,068 | 5,762 | 16,311 | 22,190 | 5,516 | | |
| 1902..... | 40,838 | 2,559 | 14,476 | 23,892 | 7,254 | | |
| 1903..... | 53,388 | 586 | 18,058 | 22,177 | 6,152 | | |
| 1904..... | 46,039 | 35 | 21,626 | 29,273 | 6,557 | | |
| 1905..... | 49,747 | 2,607 | 21,980 | 33,250 | 8,447 | | |
| 1906..... | 59,627 | 2,661 | 21,781 | 42,080 | 9,053 | | |
| 1907 (9 mos.)..... | 40,780 | 245 | 20,498 | 41,086 | 5,745 | | |
| 1908..... | 65,125 | 3,396 | 26,159 | 57,760 | 8,917 | | |
| 1909..... | 56,692 | 1,141 | 25,931 | 47,700 | 8,117 | | |
| Calendar Year. | | | | | | | |
| 1910..... | 71,394 | 854 | 40,400 | 92,890 | 14,829 | 6,647 | 148,384 |
| 1911..... | 123,356 | 1,642 | 46,274 | 104,170 | 18,779 | 8,340 | 164,474 |
| 1912..... | 112,020 | 1,409 | 46,616 | 130,571 | 21,310 | 13,347 | 189,782 |
| 1913..... | 145,247 | 1,784 | 48,995 | 135,654 | 17,861 | 10,168 | 171,516 |
| 1914..... | 98,872 | 16 | 29,127 | 88,881 | 16,976 | 13,743 | 138,415 |

(a) Emery in bulk, crushed or ground. Duty free.

(b) Emery and carborundum wheels and manufactures of emery or carborundum.

(c) Burrstones in blocks, rough or unmanufactured, not bound up or prepared by binding into millstones.

(d) Pumice and pumice stone, ground or unground. Duty free.

(e) Iron sand or globules for polishing glass or granite, or for sawing stone. Duty free.

(f) Sandpaper, glass, flint, and emery paper or emery cloth.

The following is a list of the operators reporting production of grindstones, pulpstones, and scythestones for 1914.

The Mic Mac Grindstone Co., Ltd., New Glasgow, N. S.

Jos. W. Sutherland, West Merigomish, N. S.

The Read Stone Company, Stonehaven, N. B.

Sackville, “

J. L. C. Knowles, Clifton, N. B.

The Miramichi Quarry Co., Ltd., Quarryville, N. B.

TRIPOLITE.

Recent requests for information concerning the possibility of securing supplies of tripolite or diatomaceous earth in Canada have prompted this summary of information on the subject.

In its natural state tripolite contains from 25 to 45 per cent of moisture which is expelled at 100°C, and is a pure white to brownish, very light, soft, easily abraded material. It is rarely pure, being usually contaminated with varying proportions of carbonates of lime and magnesia, clay, etc., the silica contents varying between 75 and 90 per cent.

In the Annual Report of the Geological Survey of Canada for 1902-03 there appears a resume of the information then available re infusorial earth.¹ This bulletin, prepared by Mr. Theo. Denis, described particularly the mode of formation, and uses of this mineral, and enumerated all known Canadian occurrences.

Since this publication appeared the uses to which tripolite may be put have increased many fold. The various physical and chemical properties of the substance which are responsible for the widening field in which it is being used are described in the Mineral Industry for 1913.² It is there stated that the effectiveness of infusorial earth as a thermal insulator has led to its extensive use “for the production of fireproof, and incombustible insulator in the form of loose powder, solid natural blocks, burned insulating brick and tile, pipe covering, etc., for both high temperatures in ovens, cookers, furnaces, annealing pits, boilers, evaporators, stills, and for low temperatures in cold storage and refrigerator plants, ice-houses, ice-boxes, coolers, and similar purposes. It has the advantage over the organic insulating materials, some of which have a somewhat higher thermal resistivity, in that it is unaffected by extreme heat or cold, and is not subject to decomposition, decay, or any physical change with time.” The refractory nature of the substance, with its low thermal conductivity, “opens up a wide field for its use in the ceramic industries for the production of light weight brick and tile, for insulating and refractory purposes. Owing to the low apparent density of the pulverized tripolite it has found extensive application for fire protection in buildings as a light fireproof wall-filler.

¹ Geol. Sur. Can. Annual Report, 1902-03, Vol. XV, p. 195s.

² Diatomaceous Earth, by P. A. Boeck, Mineral Industry, Vol. XXII, 1913.

On account of its smothering effect caused by the exclusion of oxygen from the vicinity of the flame, it is also used as a fireproofing and insulating material in safes, ovens, fireless cookers, electric fuse protectors, etc."

At present, in addition to its oldest uses as a polishing material, and a thermal insulator, it finds a wide application being used as a filler for rubber goods, and records for talking machines, a wood-filler in paints, for water filters, and beet sugar solution filters, as an absorbent for artificial fertilizers, for glazing tiles and pottery, and in the manufacture of water glass, ultramarine and various pigments, analine and alizarine colours, paper, sealing wax, fireworks, matches, gutta percha articles, solidified bromine, papier-mache, and many other articles.

The preparation of tripolite and its uses are described in a recent report¹ of the Mines Branch, which contains also a record of consumption in-so-far as such information could be obtained. Mr. Fréchette states, referring to its preparation, that the tripolite as removed from the deposit "is washed, dried, ground, and very carefully sized. The finest sizes are obtained by air-floating the undersize from the last bolting." The drying is done in kilns, and the grinding between burrstones, with a final crushing between rolls.

"For the finer polishing grades, and for some other purposes a pure white product is specified. The darker material finds a market principally for rubber-filling for which purpose careful sizing is not essential."

As a polishing material tripolite is prepared in three forms:—

- "(1) Dry powder to be moistened or otherwise prepared by the user.
- (2) Mixed with about one-third its weight of tallow or other hard grease and moulded into bricks or sticks—"grease brick." This is used on buffing wheels.
- (3) Mixed with some form of cleansing liquid in the form of the well-known liquid metal polishes."

The total Canadian production of tripolite to the end of 1914 has been 7,779 tons valued at \$128,234. Recent sales of crude tripolite were reported at \$20 per short ton. The shipments from year to year have varied very much, and in some seasons the producing companies shipped from stock only.

From 1902 to the present, Nova Scotia has been the only province producing tripolite, and three companies only have appeared on the list of shippers. These are the Premier Tripolite Company with deposits (un-worked for several years) at St. Ann's in Victoria county, Cape Breton Island. The Fossil Flour Company, formerly operating at Bass River lake, Colchester county, near Castlereagh; and the Oxford Tripoli Company operating at Silica lake (formerly Bass River lake), Colchester county, the latter Company having taken over the property of the Fossil Flour Company.

¹ Non-Metallic Minerals in Canadian Manufacturing, Fréchette, Mines Branch Publication No. 305.

At the plant of the Oxford Tripoli Company, the crude product is dried and treated on the spot in a 10-ton mill, after which it is exported to the United States.

The references to tripolite in Canadian geological and mining literature during recent years are few.

A sample of infusorial earth from Sabody Pond, Middle river, near Chester, Lunenburg county, N. S., was received at the Geological Survey Museum in 1904¹ but no further mention of this occurrence has been made.

Recently, a new occurrence in this Province has been described.² This is near Loon Lake falls on the Liverpool river, 8½ miles west of Caledonia, the terminus of the Halifax and Southwestern Railway. When seen by M. Faribault, the deposit was undeveloped but the chances of it being a few feet thick and extending over a considerable area seemed fair.

The occurrence at Fitzgerald lake, near St. John, New Brunswick, mentioned by Mr. Denis, has been referred to in subsequent Geological Survey publications³; but no shipments for other than experimental purposes are known to have been made.

No mention of tripolite deposits in Quebec has been made for several years.

In Ontario, a reported occurrence in Muskoka was made in the Bureau of Mines Report for the year 1910; but no additional information has appeared.

In British Columbia a deposit of unknown size on the Queen Charlotte Ids. was reported to the Mines Branch in 1914. On Vancouver Island within 10 miles of the city of Victoria there is a deposit of diatomaceous earth described by Mr. Clapp of the Geological Survey Branch⁴ as follows:—

"A deposit of diatomaceous earth, or as it is commonly, although incorrectly called, 'infusorial earth,' occurs below the surface soil in the wide valley north of Prospect lake in Lake District. Its extent and thickness is not definitely known, but it must occur in considerable amounts, since it may be seen at intervals for at least half a mile north of Prospect lake, and is at least two or three feet thick. It is light grey, uniform in appearance and free from grit. Microscopically it is seen to consist of the siliceous tests of diatoms, largely broken to submicroscopic grains, although many straight columnar forms are present, mixed with a considerable amount of fine argillaceous matter. The following is a partial analysis of it by Mr. H. A. Leverin, of the Mines Branch, of the Department of Mines:—

¹ Geol. Sur. Can. Annual Report, Vol. XVI, Part A. p. 246.

² Geol. Sur. Can. Summary Report for 1914, p. 106.

³ Geol. Sur. Can. Publication No. 983, Ellis, p. 127.

⁴ " " Summary Report for 1913, p. 242.

⁵ Geol. Sur. Can. Memoir No. 36, Clapp, p. 137.

| | % |
|---------------------|-------|
| Silica..... | 75.92 |
| Alumina..... | 8.23 |
| Ferric-oxide..... | 3.43 |
| Magnesia..... | 1.28 |
| Lime..... | 1.85 |
| Soda..... | 1.39 |
| Potash..... | 0.94 |
| Carbon dioxide..... | 1.08 |
| Combined water..... | 5.40 |
| | 99.52 |

"As may be seen from the description and analysis, the deposit is of a moderate degree of purity, and is suitable for many of the varied uses to which diatomaceous earth may be put, such as polishing powders, absorbents, non-conductors, fertilizers, and many other products."

The following is a list of producers of tripolite operating in Canada in recent years:—

Producers of Tripolite.

| Operator. | Address. | Location of Property. | Mine Office. | Manager or Representative. |
|---------------------------|---------------------------------|---|-------------------------------|----------------------------|
| Oxford Tripoli Company | Oxford, N.S..... | Silica Lake (formerly Bass R. Lake), Colchester co. | Silica L., N.S. | A. M. Hinckley. |
| Premier Tripolite Company | 159 Maiden Lane, New York, N.Y. | Munro Pt. St. Ann's Victoria co., Cape Breton Id., N.S. | St. Ann's, Victoria co., N.S. | A. Fraser. |

Tables showing the annual consumption of tripolite both crude and in grease brick, in Canada, so far as information could be secured, follow, being taken from Mr. Frechette's monograph already mentioned.

Consumption of Crude Tripolite.

| Location. | No. of firms reporting consumption. | Domestic. | Imported. |
|-------------------------|-------------------------------------|-----------|-----------|
| | | Tons. | Tons. |
| Maritime Provinces..... | 1 | Nil. | 7/20 |
| Quebec..... | 4 | " | 43-10/20 |
| Ontario..... | 8 | " | 17- 5/20 |
| Prairie Provinces..... | 1 | " | 35 |
| British Columbia..... | — | — | — |
| Canada..... | Total consumption. | — | 96- 2/20 |

Consumption of Tripolite Grease Brick.

| Location. | No. of firms reporting consumption. | Domestic | Imported | Equivalent amount in crude. |
|-------------------------|-------------------------------------|----------|-----------|-----------------------------|
| | | Tons. | Tons. | Tons. |
| Maritime Provinces..... | 14 | Nil. | 1- 2/20 | .8 |
| Quebec..... | 12 | " | 8-16/20 | 6.6 |
| Ontario..... | 102 | " | 101-3/20 | 75.9 |
| Prairie Provinces..... | 10 | " | 2-10/20 | 1.9 |
| British Columbia..... | 7 | " | 2- 2/20 | 1.6 |
| Canada..... | Total consumption. | — | 115-13/20 | 86.8 |

The following table gives statistics of the Canadian production from 1896 to date, all of which has been exported.

Annual Shipments of Tripolite.

| Calendar Year. | Tons. | Value. | Calendar Year. | Tons. | Value. |
|----------------|-------|--------|----------------|-------|--------|
| | | \$ | | | \$ |
| 1896..... | 644 | 9,960 | 1906..... | Nil. | Nil. |
| 1897..... | 15 | 150 | 1907..... | 30 | 225 |
| 1898..... | 1,017 | 16,660 | 1908..... | 30 | 195 |
| 1899..... | 1,000 | 15,000 | 1909..... | Nil. | Nil. |
| 1900..... | 336 | 1,950 | 1910..... | 22 | 134 |
| 1901..... | 850 | 15,300 | 1911..... | 20 | 122 |
| 1902..... | 1,052 | 16,470 | 1912..... | 38 | 230 |
| 1903..... | 835 | 16,700 | 1913..... | 620 | 12,138 |
| 1904..... | 320 | 6,400 | 1914..... | 650 | 13,000 |
| 1905..... | 300 | 3,600 | | | |

A record of analyses of tripolite or diatomaceous earth from Canadian deposits follows, together with a table of analyses of samples from various other localities quoted for purposes of comparison.

Tripolite: Analyses of Canadian Samples.

| Locality. | 1 | 2 | 3 | 4 | 5 | 6 |
|-----------------------|-----------------|-----------------|-------------|-----------------|------------------|--------------|
| Sample from. | H. S. deSchmid. | H. S. deSchmid. | R. W. Ells. | H. S. deSchmid. | E. A. D. Morgan. | C. H. Clapp. |
| Silica..... | 72.10 | 81.30 | 80.487 | 74.98 | 79.20 | 75.92 |
| Alumina..... | — | — | 3.146 | 3.81 | 3.98 | 8.23 |
| Ferric oxide..... | — | — | .951 | .72 | .57 | 3.43 |
| Ferrous oxide..... | .51 | .38 | — | .64 | .51 | — |
| Lime..... | — | — | .342 | .54 | .68 | 1.85 |
| Magnesia..... | — | — | .283 | .36 | .33 | 1.28 |
| Soda..... | — | — | — | .65 | .94 | 1.39 |
| Potash..... | — | — | — | .25 | .39 | .94 |
| Water—below 110 C.... | 6.10 | 5.16 | 13.321 | 5.74 | 8.26 | 5.40 |
| Water—above 110 C.... | 10.70 | 9.34 | | 9.56 | 3.84 | |
| Organic matter..... | 6.30 | .82 | | 2.72 | 1.80 | |
| Carbon dioxide..... | Nil. | Nil. | .011 | Nil. | Nil. | 1.08 |
| Total..... | — | — | — | 99.97 | 100.50 | 99.52 |

Analyses by Laboratory of Mines Branch, Ottawa.

Key to Localities:—

1. St. Ann's, Victoria co., N.S. Operator, Premier Tripolite Co., 159 Maiden Lane, New York.
2. Silica Lake, Colchester co., N.S. Operator, Oxford Tripoli Co., Oxford, N.S.
3. Pollet River lake, Mechanic's Settlement, Kings co., N.B.
4. Fitzgerald lake, St. John co., N.B.
5. Chertsey tp., Range V, Lot 15, Montcalm co., Que.
6. Prospect lake, Lake District, near Victoria, B.C.

Tripolite: Analyses of Representative Samples.

| Locality. | Hanover. | Germany. | Scotland. | Auvergne, France. | Maryland, U.S.A. | Virginia, U.S.A. |
|---|----------|----------|-----------|----------------------|---------------------|---------------------|
| Silica..... | 86.4 | 68.01 | 92.0 | 87.2 | 81.53 | 75.85 |
| Alumina..... | 1.6 | 7.13 | — | 2.0 | 3.43 | 9.88 |
| Ferric oxide..... | 1.5 | 6.82 | 2.5 | — | 3.33 | 2.92 |
| Lime..... | 1.3 | — | — | — | 2.61 | .29 |
| Magnesia..... | — | — | — | — | 5.63 | 1.63† |
| Water..... | 6.9 | 8.45 | — | 10.0 | 3.47 | 8.37 |
| Other volatile and or- ganic matter..... | 2.3 | 8.17 | 5.5 | — | — | — |
| Total..... | 100.0 | 98.58 | 100.0 | 99.2 | 100.0 | 98.95 |

† Including potash and soda.

Below is tabulated a brief record of all reported occurrences of tripolite or diatomaceous earth in Canada.

Tripolite: Canadian Occurrences.

| County. | Location. | Owner or Operator. | Description. |
|------------------|--|--|---|
| | NOVA SCOTIA. | | |
| Antigonish..... | Lochaber L. ³ | | |
| Cape Breton..... | Ainsley L. ³ | | |
| Colchester..... | Silica L. ^{3, 10} (Formerly Bass River L.) 12 mi. from Thompson, I.C.R. Folly L. ³ (I.C.R.)..... | Oxford Tripoli Co., Oxford, N.S. | Area: 12 acres. Earth re- moved from whole area. Mill on property. |
| | Mackintosh L. ³ | | Area: 135 acres. Worked to small extent prior to 1903. |
| | Earltown L. ³ | | |
| | Gully L. ³ | | |
| Cumberland..... | Fountain L. ³ 8 mi. from I.C.R. | | Worked to slight extent prior to 1903. |
| | Cobequid Mts. area ³ | | Small deposits in many lakes. |
| Digby..... | Meteghan River ² | | Beds reported 8' thick. |
| Halifax..... | Dartmouth L. ¹² (near Halifax city) Grand L. ¹² (Near Halifax city). Paint L. ⁸ (Near head of Chezzet- cook). | | Beds reported 8' thick. |
| Inverness..... | River Denys, ³ on I.C.R. | | Small amount work done. |
| Lunenburg..... | Sabody Pond, ⁴ on Middle River near Chester. | Capt. Lordley, Chester, N.S. | |
| Pictou..... | Upper Barney River ⁴ | Alex. Sutherland..... | Extent not known. Thick- ness 2'. |
| | Mackay L. ³ | | |
| | Black Brook Lake ³ | | |
| | Garden of Eden L. ³ | | |
| | Grant L. ³ | | |
| | McLean L. ³ | | |
| | Calder L. ³ | | |
| | Forbes L. ³ | | |
| | Ben L. ³ | | |
| | Toney L. ³ | | |
| Queens..... | Loon L. Falls, ⁶ on Liverpool River, 8½ mi. from Caledonia, N.S. | | Undeveloped. Chances of tonnage fair. |
| Victoria..... | St. Ann's P.O. Munro Pt. ^{3, 10} 25 mi. from North Sydney. | Premier Tripolite Co. (Lessee). 159 Maiden Lane, New York. F. Torrence..... | Area: 12 acres. Only par- tially worked over. Not operated in recent years. |
| | Englishtown, ³ 22 mi. from North Sydney. | | |

| County. | Location. | Owner or Operator. | Description. |
|-----------------------------|---|--|---|
| NEW BRUNSWICK. | | | |
| Kings | Pollet River L. ³ , ⁷ Mechanic's Settlement, P.O. 11 mi. from I.C.R. Pleasant L. ³ 1 mi. s.w. of Pollet L. Westfield ⁷ —across St. John river from, | | Thickness 4'. Lake drained and preparation made for working. |
| St. John..... | Fitzgerald L. ³ , ⁵ , ⁷ , ¹⁰ 7 mi. from St. John city. | Wm. Murdock, St. John city. (Owner). Boston & St. John Tripolite Company. (Lessees). | No information. Occurrence noted on Mineral Map of New Brunswick. Map No. 969 Geol. Sur. Can. Area: 50 acres. Thickness 10'. Shipments for experimental purposes <i>only</i> to date. |
| QUEBEC. | | | |
| Maskinonge..... | St. Justin, ⁸ Con. Trompe Souris. | | Small quantities in a sand bank. |
| Montcalm..... | Chertsey Tp. R.V., Lot 15 ³ 11 | E. A. D. Morgan, Montreal, P.Q. | Area: 4 acres. Thickness 18". |
| Montmorency..... | Laval Settlement. ³ R. II, Lot 20. At Junction Bras & Montmorency Rivers. | | Thickness 15". Overburden 50'. |
| St. Maurice (or Champlain). | Shawenegan, ³ near..... | | |
| Quebec..... | Stoneham, Tp. Lot 69 ³ | | |
| ONTARIO. | | | |
| Muskoka..... | Bala, near, ¹³ | Thos. Orgill, Glen Orchard.. | Believed to be in deposits of workable size. |
| BRITISH COLUMBIA. | | | |
| | Blackwater River ¹ | | |
| | Mission City, opposite ⁸ on Fraser river. | | |
| | Queen Charlotte Ids. ¹¹ | Merton A. Merrill, Regina, Sask. | Quality reported satisfactory. |
| | Vancouver Id. At Prospect lake, ⁹ 10 mi. from Victoria | | Quality fair. Thickness not known. Prospects fair. |

Key to References.

- ¹ Geol. Sur. Can. Report 1875-76, p. 256.
² " " " Ann. Report Vol. IX, Sec. A. p. 93.
³ " " " " " XV, " S. pp. 25-28.
⁴ " " " " " XVI, " A. p. 346.
⁵ " " " Summ. Report, 1913, p. 242.
⁶ " " " " " 1914, p. 106.
⁷ " " " Geology & Mineral Resources of New Brunswick, Ellis, Publication No. 983.
⁸ " " " Memoir No. 20-E, p. 300.
⁹ " " " " No. 36, p. 137.
¹⁰ Mines Branch Summ. Report 1914.
¹¹ " " Files.
¹² Mines and Minerals of Nova Scotia, Gilpin, 1880, p. 115.
¹³ Ontario Bureau of Mines. Reports Vol. XX, p. 45.

ACTINOLITE.

The production of actinolite in Canada has been confined to Elzevir and Kaladar townships in Hastings and Addington counties, Province of Ontario, the centre for the industry being the village of Actinolite. The earliest operations date back to about 1883. Deposits have been worked only at intervals long apart when sufficient rock was broken to meet the demand for several subsequent years. As a rule there is ground each year just sufficient rock to meet the market requirements of that year. The only statistics of production prior to 1909 now available are for the years 1901, 1902 and 1903 when the output was valued at \$3,126, \$6,150, and \$1,650 respectively.

Actinolite is used as an ingredient of a coal-tar roofing compound, the grinding of the crude material being done in such a way as not to destroy the fibre.

An interesting review of the industry appearing in the Ontario Bureau of Mines Reports¹ was quoted in last year's report on the Mineral Production of Canada.

The only shipper in recent years is the Actinolite Mining Company at Bloomfield, New Jersey, U. S. A., which owns deposits of actinolite in Kaladar and Elzevir townships, and a mill for grinding the same at Actinolite, Ontario.

Statistics of production during recent years are given in the following table.

Annual Production of Actinolite.

| Calendar Year. | Tons. | Value. | Average Price. |
|----------------|-------|--------|----------------|
| | | \$ | \$ cts. |
| 1909..... | Nil. | Nil. | ..... |
| 1910..... | 30 | 330 | 11.00 |
| 1911..... | 67 | 736 | 11.00 |
| 1912..... | 92 | 1,000 | 10.87 |
| 1913..... | 66 | 720 | 10.91 |
| 1914..... | 119 | 1,304 | 10.96 |

¹ Ontario Bureau of Mines, Vol. XXII, Part II, p. 117.

ALUNITE AND PYROPHYLLITE.

The Provincial Mineralogist of British Columbia in his Annual Report for 1914 states: "Besides some development work done, the San Juan Mining and Manufacturing Company, has shipped 75 tons of natroalunite ore from its property, situated on Kyuquot Sound and has now 250 tons ready for shipment."

This occurrence of alunite and pyrophyllite at Kyuquot, Vancouver Island, is considered of sufficient interest to reproduce herewith the report¹ on an examination of the deposits by Mr. Charles H. Clapp for the Geological Survey.

"In the southwestern part of Kyuquot sound, which is one of the large fiords indenting the west coast of Vancouver island, the metamorphic volcanic rocks, which comprise the greater part of Vancouver island, have been peculiarly altered to rocks containing large amounts of alunite and pyrophyllite. These deposits of alunite and pyrophyllite, which are the only deposits of their kind known in Canada, were "staked" in 1908, and during the last few years the pyrophyllite rock has been quarried by the British Columbia Pottery Company as a "fireclay," and by the San Juan Mining and Manufacturing Company as a base of a powdered "household cleanser." Of late years alunite has attracted considerable attention as a possible source of "potash," as well as a source of alum, so that the writer was directed to make an examination of the Kyuquot deposits during the summer of 1913. Accordingly, he spent four days during July examining the deposits and in making a reconnaissance in a launch of the neighboring shores. He was accompanied throughout the examination by the late Mr. William J. Sutton, of Victoria, at the time geologist for the Canadian Collieries (Dunsmuir) Company, and one of the best informed men concerning the natural resources of Vancouver island; by Mr. Wally, chemist of the San Juan Mining and Manufacturing Company, and J. L. Hangi of the British Columbia Pottery Company.

"The principal alunite and pyrophyllite deposits are situated in a small peninsula in the northwestern part of Kyuquot sound between Kokshittle arm and a small inlet called Easy creek. The peninsula has a general northwest trend and is slightly over 2 miles in length and from 1,500 to 3,000 feet in width. The deposits occur in the outer northwestern portion within an area of somewhat more than 1 square mile. Kyuquot sound is reached by the C. P. R. steamer Princess Maquinna, which plies between Victoria and the ports of the west coast of Vancouver island. It touches at Kyuquot village at the entrance to Kyuquot sound twice a month and, if there is freight, calls at the quarries of the British Columbia

¹ Extract from Report by Charles H. Clapp. Summary Report Geological Survey 1913, p. 109.

Pottery Company and of the San Juan Mining and Manufacturing Company in the pyrophyllite and alunite deposits. Other coasting vessels occasionally call at Kyuquot sound, and the deposits may be safely reached during the greater part of the year by launches from Alberni or Clayoquot sound.

"The alunite in the Kyuquot Sound deposits is the sodic variety, natroalunite, and it occurs, mixed with quartz, diaspore, sericite, and other minerals in masses of quartz-alunite rock, of which the alunite forms from 20 to 45 per cent. As yet the San Juan Mining and Manufacturing Company, who own the alunite deposits, have not used the alunite rock, although they have announced their intention of manufacturing alum. Alunite is at present considered to be of value not only for alum, which is now extracted from it, but also as a source of "potash salts" for fertilizers, and as a possible source of aluminium ore. Since the Kyuquot Sound deposits contain a large percentage of impurities, and since the alunite is of the sodic variety, they are not very promising as a source of alum or other potash salts. It is, however, to be hoped, considering the large quantities of alunite available, that some use for it may be found.

"The compact variety of pyrophyllite is found in the Kyuquot Sound deposits mixed with 20 to 50 per cent of quartz and a little sericite. The quartz-pyrophyllite rock has been used successfully by the British Columbia Pottery Company as a "fireclay" to mix with surface clays and Cretaceous shales to increase the refractiveness of the mixture, which is used to manufacture sewer-pipe and fireproofing. It has also been used by the San Juan Mining and Manufacturing Company, who have taken advantage of the extremely fine-grained character and slipperiness of the rock to manufacture a powdered "household cleanser," a metal polish, and a mechanic's soap. It is probable that the pyrophyllite rock might be employed as a substitute for powdered massive talc in other uses. It is to be hoped that an increasing use for the material may be found; and although the deposits are not large, they are doubtless large enough to meet any demand that is likely to be put upon them for a great many years."

ALUNITE.

General Relations and Size of Deposits.

"Alunite is a hydrous sulphate of aluminium and potassium having the formula $K_2O, 3Al_2O_3, 4SO_3, 6H_2O$. When pure it contains 11.4 per cent of potash (K_2O), 37.0 per cent of alumina, Al_2O_3 , and 38.6 per cent of water. However, alunite is usually found in nature in an impure state, mixed with quartz, diaspore, sericite, and other minerals and containing more or less ferric oxide (Fe_2O_3) and soda (Na_2O). The sodic variety, which is the variety found in the Kyuquot Sound deposits, is properly called natroalunite.¹ Alunite occurs in a rather coarse-grained crystalline

¹ Hillebrand, W. F. and Penfield, S.L. Some additions to the Alunite-Jarosite group of minerals in Bull. U. S. Geol. Surv., No. 262, 1905, pp. 37-41.

form, but more commonly, as at Kyuquot Sound, as a fine-grained to dense, massive variety.

"A detailed description of the Kyuquot Sound alunite deposits and of the physical and chemical character of the alunite rocks has already been given. The alunite mixed with quartz and other minerals occurs in masses of quartz-alunite rocks, which have resulted from the metasomatic replacement of chiefly fragmental volcanic rocks, dacites, and feldspathic andesites. Only one large deposit is known: it occurs on the Morris claim, and is about $4\frac{1}{2}$ acres in area. This deposit extends to and below sea-level and contains above sea-level about 600,000 tons. Another much smaller deposit occurs along the shore to the east on the Snowstorm claim. As presented under a previous section, it is believed that the alunite deposits have been formed by uprising thermal waters, so that it is probable that the deposits extend below sea-level for an indefinite distance, which, however, is probably not more than a few hundred feet.

"Alunite forms from 20 to at least 45 per cent of the alunite rocks and it is mixed chiefly with quartz varying from 40 to 50 per cent, sericite varying from virtually nothing to 14 per cent, a little diasporite, and usually pyrite. The pyritiferous alunite rocks are bluish-grey in colour and are found chiefly near sea-level, at or below the present ground-water level and have been leached of their pyrite by descending rain waters. A part of the iron of the pyrite has been removed by the waters and has cemented the beach rubble fringing the alunite deposit, into a fairly firm rock. The remaining iron of the pyrite has been oxidized to limonite, which gives the surface rocks their reddish colour. Free sulphur has also resulted from the oxidation of the pyrite, and occurs, mixed with the limonite and with kaolin. According to the analysis of the samples collected by the writer, it appears as if the reddish to white surface rocks contain more alunite than the bluish-grey, unoxidized rocks; it thus appearing as if part of the alunite in the surface rocks was the result of the oxidation of sulphur in the pyrite and its reaction with the alumina and alkalis remaining from the original volcanics. However Mr. Wally, chemist of the San Juan Mining and Manufacturing Company, who has tested the deposit carefully, claims that the bluish-grey rocks contain on the whole more alunite than the reddish to white rocks, and he believes that alunite as well as pyrite has been leached from the latter rocks."

Future Possibilities.¹

"Alunite has been mined for alum and aluminium sulphates at several localities in other continents, chiefly at Tolfa, Italy, about 35 miles northwest of Rome, and near the village of Bulla Delah, New South Wales, Australia. At present no use has been made of the several deposits of alunite known in

¹ The commercial availability of alunite, its occurrence in the United States and elsewhere, and the process employed in the manufacture of alum and aluminium sulphates from alunite are excellently and concisely summarized by B. S. Butler and H. S. Gale in Bull. U. S. Geol. Surv. No. 511, 1912, pp. 38-64, and the following material has been largely taken from this publication.

the United States, although they have lately attracted considerable interest on account of the increased demand for potash salts, which are used chiefly and very extensively in the manufacture of fertilizers. The United States Geological Survey has also drawn attention to the possibility of using alunite not only as a source of alum and of other potash salts, but as a source of alumina. This suggestion is based on the results of the laboratory experiments on fairly pure alunite by W. T. Schaller, who has made the following observations:—

“Laboratory experiments showed that on igniting the powdered alunite all of the water and three-quarters of the sulphuric acid are volatilized. On leaching the residue with water the potassium sulphate is dissolved, leaving the insoluble aluminum oxide behind.

“The average amount of potassium sulphate leached from the ignited mineral powder is 17·9 per cent of the original material used. As the coarsely crystallized alunite was found to contain 19·4 per cent of potassium sulphate, 92 per cent of the total potash present was obtained by simple ignition and subsequent leaching.

“It is worth noting that, according to the laboratory experiments, 32·7 per cent of the ignited alunite consists of available potassium sulphate, which can be extracted by simple water leaching and evaporation. The remaining 67·3 per cent consists of nearly pure aluminum oxide.

“It is suggested that in commercial practice the potassium in the alunite be utilized in the form of the simple sulphate instead of alum, thus leaving as a by-product the insoluble and nearly pure aluminium oxide, which might possibly be used as a substitute for the mineral bauxite in the manufacture of metallic aluminum.

“Since the Kyuquot Sound deposits certainly do not contain on the average more than 45 per cent of alunite, and since the alunite is the sodic variety (natroalunite), the deposits, to judge from the fact that all the alunite rock in the Bulla Delah deposits carrying over 10 per cent of silica is discarded,¹ are not very promising as a commercial source of alum or other potash salts, unless the alunite rock might also be used as an ore for aluminum or for some other use. Whether or not the alunite rock might be used as an aluminum ore is questionable, since as yet no attempt has been made to produce aluminum from alunite. Considering the relatively large quantities of alunite in the Kyuquot deposits, it is greatly to be hoped that some use for it may be found.”

PYROPHYLLITE.

General Relations and Size of Deposits.

“Pyrophyllite is a hydrous silicate of alumina, H_2O , Al_2O_3 , 4SiO_2 , that occurs in two varieties, as a foliated and often radiated mineral, and as a compact massive mineral with a soapy feel, frequently called agalmatolite. This compact variety is the variety found in the Kyuquot Sound deposits,

¹ Loc. cit. p. 60. Quotation from Pitman, E.P. Alunite or alumstone in New South Wales, Rept. Geol. Surv., New South Wales, 1901, pp. 419-429.

although, as already described, it occurs mixed with considerable quartz, from 20 to 50 per cent, and more or less sericite, from virtually nothing to 8 per cent. There are two deposits of the fairly pure quartz-pyrophyllite rock, one of about 3 acres in area on the Deertrail claim extending east to the Morris claim, and the other about 1 acre in area on the Monteith claim. The deposits, as shown by the quarries already opened up in them and by their outcrops, extend to sea-level, and the tonnage in each of the deposits above sea-level is about 400,000 tons in the Deertrail claim deposit and 100,000 tons in the Monteith claim deposit."

Development of Uses.

"So far as known to the writer pyrophyllite is not used very extensively and the only uses to which pyrophyllite has been put are, as listed in the various books on mineralogy, for slate pencils, French chalk, and as an easily carved ornamental stone, the Orientals using it to carve images and small ornaments. It is also used as a substitute for talc and is usually sold under that name. Pyrophyllite is, however, less valuable than true talc, although it is claimed that for bleaching cotton cloth, pyrophyllite is better than talc.¹ Thus the uses to which the Kyuquot pyrophyllite has been put, as a fireclay and as a "household cleanser" are rather unique. The British Columbia Pottery Company have been quarrying the deposit on the Monteith claim since 1910 to obtain a refractory material, virtually a fireclay, to mix with the surface clays dug near their plant in Victoria West, and with the Cretaceous shales from Comox, in order to increase the refractiveness of the mixture. The mixture has been used successfully for the manufacture of sewer-pipe and fireproofing. By itself, even the most highly weathered of the quartz-pyrophyllite rock, that rock containing most kaolin, is of poor plasticity. Ries and Keele² give the following results of laboratory tests made on a sample taken from the stock pile at the British Columbia Pottery Company's factory:—

"The San Juan Mining and Manufacturing Company has taken advantage of the fact that the quartz-pyrophyllite rock breaks up into an extremely fine powder, which, for the greater part, contains no grit coarse enough to feel between the fingers or the teeth, to use the powdered rock as a polishing powder and as a base for a "household cleanser," a metal polish and a mechanic's soap. Since pyrophyllite has a hardness of only 1 to 2, it is of no value in itself as a polishing powder, but the Kyuquot pyrophyllite is, as described, mixed with 20 to 50 per cent of quartz, which occurs in very fine grains, averaging less than 0.001 mm. in diameter, and this quartz serves as the abraiding substance. The pyrophyllite on account of its softness and slipperiness is, however, probably of value in the polishing powder,

¹Diller, J. S. Talc and Soapstone in Mineral Resources of the United States for 1912. Part II, 1913, pages 1139-1143.

²Ries, H. and Keele, J., Clay and Shale Deposits of the Western Provinces, Memoir No. 24, Geol. Surv., Can., 1912, pp. 148-150.

serving to keep the quartz from scratching. The softness and soapy feel of the pyrophyllite, like that of talc, makes the material of value as a base for soap, although for this use, except for the lower grades of soap, the quartz seems undesirable. The chief difficulty experienced in the manufacture of these products is in getting rid of the coarse grains of quartz; but if this is done satisfactorily the resulting products would seem to be of fairly good grade. As yet the San Juan Mining and Manufacturing Company have opened up only a small quarry in the Deertrail claim deposit and have been manufacturing their products spasmodically since 1911 in their factory in Esquimalt, west of Victoria."

ARSENIC.

Canada's production of white arsenic up to 1903 was secured from a plant at Deloro, Ontario, which treated mispickel residues from which the gold content had been extracted by amalgamation, and bromo-cyanide treatment. Since 1903 though, even in spite of a bounty offered in 1907 by the Ontario Government on "white arsenic, otherwise known as arsenious oxide, produced from mispickel ores, and not from ores carrying smaltite, niccolite, or cobaltite" the industry has been dormant.

In 1906 plants treating cobalt ores made provision for the recovery of white arsenic as a by-product, and since then white arsenic has been produced each year, the production for the last five years being fairly constant in quantity. On this white arsenic no bounty is payable.

The plants which have been producing white arsenic from cobalt ores are located at Deloro, Thorold, Orillia and Copper Cliff, all in the Province of Ontario. In 1914 only two of these were operating, viz: the Deloro plant of the Deloro Mining and Reduction Company, and the Thorold plant of the Coniagas Reduction Company.

Arsenical ore concentrates were shipped for several years by a gold mining company in Nova Scotia, but the last of these was made in 1910.

The total production of white arsenic in 1914 was 1,737 tons, valued at \$104,015, as compared with 1,692 tons, in 1913, valued at \$101,463, and 2,045 tons in 1912, valued at \$89,262.

The exports of white arsenic in 1914, according to the records of the Department of Customs were 3,751,900 pounds (1,876 tons) valued at \$132,567, as compared with 2,606,767 pounds (1,303 tons) in 1913, valued at \$107,094.

The imports of white arsenic, or arsenious oxide, in 1914 were 5,012 pounds, valued at \$249, as compared with 18,788 pounds in 1913, valued at \$1,061. Imports of sulphide of arsenic in 1914 were 11,494 pounds, valued at \$756, as compared with imports in 1913 of 455,394 pounds, valued at \$17,759. There was also imported during 1914, arseniate, bi-arseniate and stannate of soda to the amount of 14,389 pounds, valued at \$604, as compared with 22,892 pounds in 1913, valued at \$987.

Annual Production of Arsenic.

| Calendar Year. | ARSENICAL ORE. | | WHITE ARSENIC. | |
|----------------|----------------|--------|----------------|---------|
| | Tons. | Value. | Tons. | Value. |
| | | \$ | | \$ |
| 1885..... | | | 440 | 17,600 |
| 1886..... | | | 120 | 5,460 |
| 1887..... | | | 30 | 1,200 |
| 1888..... | | | 30 | 1,200 |
| 1889..... | | | Nil. | Nil. |
| 1890..... | | | 25 | 1,500 |
| 1891..... | | | 20 | 1,000 |
| 1892-3..... | | | Nil. | Nil. |
| 1894..... | | | 7 | 420 |
| 1895-8..... | | | Nil. | Nil. |
| 1899..... | | | 57 | 4,872 |
| 1900..... | | | 303 | 22,725 |
| 1901..... | | | 695 | 41,676 |
| 1902..... | | | 800 | 48,000 |
| 1903..... | | | 257 | 15,420 |
| 1904-5..... | | | | |
| 1906..... | | | 201 | 14,058 |
| 1907..... | 656 | 11,094 | 330 | 36,209 |
| 1908..... | 986 | 17,506 | 715½ | 41,060 |
| 1909..... | 224 | 3,346 | 1,129 | 64,100 |
| 1910..... | 547 | 5,716 | 1,502 | 75,328 |
| 1911..... | | | 2,097 | 76,237 |
| 1912..... | | | 2,045 | 89,262 |
| 1913..... | | | 1,692 | 101,463 |
| 1914..... | | | 1,737 | 104,015 |

Exports of White Arsenic.

| Calendar Year. | Pounds. | Value. | Calendar Year. | Pounds. | Value. |
|----------------|-----------|--------|----------------|-----------|---------|
| | | \$ | | | \$ |
| 1902..... | 547,698 | 16,192 | 1909..... | 3,111,249 | 119,673 |
| 1903..... | 395,573 | 10,583 | 1910..... | 4,512,673 | 173,932 |
| 1904..... | 146,000 | 6,900 | 1911..... | 4,125,558 | 81,761 |
| 1905..... | 108,000 | 5,400 | 1912..... | 3,847,906 | 101,310 |
| 1906..... | 271,063 | 5,981 | 1913..... | 2,606,767 | 107,094 |
| 1907..... | 613,504 | 10,850 | 1914..... | 3,751,900 | 132,567 |
| 1908..... | 1,913,732 | 43,493 | | | |

Annual Imports of Arsenic, 1880-1906.

| Fiscal Year. | Pounds. | Value. | Fiscal Year. | Pounds. | Value. | Fiscal Year. | Pounds. | Value. |
|--------------|---------|--------|--------------|-----------|--------|----------------|---------|--------|
| | | \$ | | | \$ | | | \$ |
| 1880..... | 18,197 | 576 | 1889.... | 69,269 | 2,434 | 1898..... | 291,967 | 14,270 |
| 1881..... | 31,417 | 1,070 | 1890.... | 138,509 | 4,474 | 1899..... | 582,383 | 24,203 |
| 1882..... | 138,920 | 3,962 | 1891.... | 115,248 | 4,027 | 1900..... | 230,730 | 11,035 |
| 1883..... | 51,953 | 1,812 | 1892.... | 302,958 | 9,365 | 1901..... | 159,263 | 8,361 |
| 1884..... | 19,337 | 773 | 1893.... | 447,079 | 12,907 | 1902..... | 106,857 | 6,004 |
| 1885..... | 49,080 | 1,566 | 1894.... | 292,505 | 10,018 | 1903..... | 298,375 | 11,824 |
| 1886..... | 30,181 | 961 | 1895.... | 1,115,697 | 31,932 | 1904..... | 414,065 | 12,421 |
| 1887..... | 32,436 | 1,116 | 1896.... | 664,854 | 27,523 | 1905..... | 268,274 | 7,661 |
| 1888..... | 27,510 | 1,016 | 1897.... | 152,275 | 8,378 | 1906 Duty free | 446,975 | 19,169 |

Imports of Arsenious Oxide and Sulphide of Arsenic.

| Calendar Year. | ARSENIUS OXIDE.* | | ARSENIC, SULPHIDE OF.* | | Total. |
|----------------|------------------|--------|------------------------|--------|--------|
| | Pounds. | Value. | Pounds. | Value. | |
| | | \$ | | \$ | \$ |
| 1907..... | 622,888 | 42,245 | 64,014 | 4,249 | 46,494 |
| 1908..... | 127,942 | 4,043 | 302,970 | 12,754 | 16,797 |
| 1909..... | 23,857 | 1,285 | 309,141 | 12,371 | 13,656 |
| 1910..... | 260,415 | 6,891 | 257,451 | 8,946 | 15,837 |
| 1911..... | 7,338 | 158 | 330,170 | 6,665 | 6,823 |
| 1912..... | 76,528 | 1,722 | 451,928 | 19,431 | 21,153 |
| 1913..... | 18,788 | 1,061 | 455,394 | 17,759 | 18,820 |
| 1914..... | 5,012 | 249 | 11,494 | 756 | 1,005 |

* Duty free.

Imports of Arseniate, Bi-Arseniate, and Stannate of Soda.

| Calendar Year. | Pounds. | Value. |
|----------------|---------|--------|
| | | \$ |
| 1907..... | 307,247 | 3,919 |
| 1908..... | 7,617 | 468 |
| 1909..... | 22,889 | 975 |
| 1910..... | 26,174 | 549 |
| 1911..... | 47,532 | 1,908 |
| 1912..... | 41,977 | 1,595 |
| 1913..... | 22,892 | 987 |
| 1914..... | 14,389 | 604 |

ASBESTOS.

Asbestos production in Canada has for many years been confined to the Eastern Townships district of the Province of Quebec—Black Lake, Thetford, Robertsonville, Danville, and East Broughton being the shipping points. Other occurrences are known; but these are not of economic interest at present.

The asbestos deposits, and the asbestos industry (up to 1910) have been described fully in a special report of the Mines Branch.¹

There is no uniform classification of the different grades of marketable, crude and milled asbestos in use by the producers. In the absence of such a classification an arbitrary one based on valuation has been adopted by the Statistical Division of the Mines Branch for the Annual Reports on Mineral Production. According to the present classification which has been in use since 1910 the various grades represent material valued as follows:—

Crude No. 1. Value \$200 per ton, and upwards.

Crude No. 2. Value under \$200 per ton.

Mill stock No. 1. Value \$30 and upwards per ton.

Mill stock No. 2. Value \$15—\$30 per ton.

Mill stock No. 3. Value under \$15 per ton.

“Asbestic,” also mentioned in the tables of statistics, is a fine asbestos powder which now enters largely into the construction and inside finish of fireproof buildings: it is manufactured from the sand and tailings from the shaking screens of some of the asbestos mills.

The 1914 returns from operators, in comparison with 1913 figures, show a decided falling off in both output and sales. The principal cause of this was the outbreak of the European war, since, during the first six months of 1914, the shipments exceeded those of the first six months of 1913. The immediate effect of the declaration of war was to deprive the producers of the German and Austrian markets, which had taken either directly or indirectly, a good share of the Canadian production. The 1914 shipments were exceeded only by those of the three previous years during each of which substantial gains were shown. The output in 1914 shows a decrease of 10·87 per cent from that of 1913, and the sales showed a decrease of 29·50 per cent in quantity. Because of slightly higher prices realized on 1914 sales the decrease in total value of sales was only 24·50 per cent.

In 1914 the output of asbestos was 107,669 tons as compared with 132,564 tons in 1913, and 102,759 tons in 1912. The total sales (not including asbestic) in 1914 were 96,542 tons valued at \$2,892,266 or an average of \$29·96 per ton, as compared with sales in 1913 of 136,951 tons

¹ Chrysotile Asbestos: Its Occurrence, Exploitation, Milling and Uses,” by Fritz Cirkel. Mines Branch, Department of Mines, Ottawa, No. 69.

valued at \$3,830,909 or an average of \$27.97 per ton: and in 1912 of 111,561 tons valued at \$3,117,572 or an average of \$27.95 per ton. Sales of asbestic in 1914 were 21,031 tons valued at \$17,540 or an average of 83 cents per ton, and in 1913 sales were 24,135 tons valued at \$19,016 or an average of 79 cents per ton. Stocks of asbestos on hand Dec. 31st, 1914, were reported as 31,171 tons valued at \$1,100,267 or an average of \$35.30 per ton, as compared with stocks on Dec. 31st, 1913, of 20,787 tons valued at \$939,720 or an average of \$45.21 per ton, and with stocks at Dec. 31st, 1912, of 23,288 tons valued at \$1,083,202 or an average of \$46.51 per ton.

The average number of men employed in mines and mills during 1914 was 2,992 at a wage cost of \$1,283,977, as compared with 2,951 men in 1913 at a wage cost of \$1,687,957.

The total quantity of asbestos rock sent to mills during 1914 is reported as 1,717,629 tons, which, with a mill production of 103,607 tons, shows an average estimated recovery of 6.03 per cent. In 1913 the recovery was 6.04 per cent, and in 1912 it was 6.01 per cent.

Statistics showing the output, sales, and stocks on hand on Dec. 31st, by grades, for the past three years are shown in the following tables:—

Output, Sales, and Stocks of Asbestos in 1914.

| | Output. | Sales. | | | Stock on hand, Dec. 31. | | |
|------------------------|-----------|----------|-----------|----------|-------------------------|-----------|----------|
| | Tons. | Tons. | Value. | Per ton. | Tons. | Value. | Per ton. |
| | | | \$ | \$ cts. | | \$ | \$ cts. |
| Crude, No. 1..... | 1,450.6 | 1,335.9 | 402,417 | 301 23 | 984.3 | 301,237 | 306 04 |
| " No. 2..... | 2,611 | 2,812 | 370,776 | 131 87 | 1,411 | 187,338 | 132 78 |
| Mill stock, No. 1..... | 16,144 | 19,388 | 932,893 | 48 12 | 4,616 | 229,361 | 49 69 |
| " No. 2..... | 58,362 | 47,851 | 963,973 | 20 15 | 15,114 | 305,809 | 20 23 |
| " No. 3..... | 29,101 | 25,155 | 222,207 | 8 83 | 9,046 | 76,522 | 8 46 |
| Total asbestos..... | 107,668.6 | 96,541.9 | 2,892,266 | 29 96 | 31,171.3 | 1,100,267 | 35 30 |
| Asbestic..... | | 21,031 | 17,540 | 0 83 | | | |

Output, Sales, and Stocks of Asbestos in 1913.

| | Output. | Sales. | | | Stock on hand, December 31. | | |
|------------------------|-----------|-----------|-----------|----------|-----------------------------|---------|----------|
| | Tons. | Tons. | Value. | Per ton. | Tons. | Value. | Per ton. |
| | | | \$ | \$ cts. | | \$ | \$ cts. |
| Crude, No. 1..... | 2,015.4 | 1,853.3 | 531,200 | 286 62 | 880.5 | 247,877 | 281 52 |
| " No. 2..... | 3,010 | 3,807 | 457,962 | 120 29 | 1,522 | 178,789 | 117 47 |
| Mill stock, No. 1..... | 23,444 | 26,198 | 1,229,908 | 46 95 | 6,755 | 350,165 | 51 84 |
| " No. 2..... | 58,592 | 60,164 | 1,201,215 | 19 97 | 4,809 | 108,285 | 22 52 |
| " No. 3..... | 45,503 | 44,929 | 410,624 | 9 14 | 6,820 | 54,604 | 8 01 |
| Total asbestos..... | 132,564.4 | 136,951.3 | 3,830,909 | 27 97 | 20,786.5 | 939,720 | 45 21 |
| Asbestic..... | | 24,135 | 19,016 | 0 79 | | | |

Output, Sales, and Stocks of Asbestos in 1912.

| | Output. | Sales. | | | Stock on hand, December 31. | | |
|------------------------|----------|-----------|-----------|----------|-----------------------------|-----------|----------|
| | Tons. | Tons. | Value. | Per ton. | Tons. | Value. | Per ton. |
| | | | \$ | \$ cts. | | \$ | \$ cts. |
| Crude, No. 1..... | 1,458½ | 1,937·9 | 510,154 | 263 25 | 866·8 | 221,289 | 255 29 |
| " No. 2..... | 3,290 | 3,725 | 380,197 | 102 07 | 2,789 | 303,063 | 108 66 |
| Mill stock, No. 1..... | 21,522 | 21,679 | 945,994 | 43 64 | 8,059 | 379,904 | 47 14 |
| " No. 2..... | 36,872 | 44,819 | 895,322 | 19 97 | 6,301 | 132,970 | 21 10 |
| " No. 3..... | 39,616 | 39,400 | 385,905 | 9 79 | 5,272 | 45,976 | 8 72 |
| Total asbestos..... | 102,758½ | 111,560·9 | 3,117,572 | 27 95 | 23,287·8 | 1,083,202 | 46 51 |
| Asbestic..... | | 24,740 | 19,707 | 0 80 | | | |

The shipment of crude asbestos and mill stock since 1903 are separately shown in the next table. The 1914 shipments of crude were 4,148 tons, a decrease of 23·1 per cent from the average of the three preceding years, and of 26·7 per cent from the 1913 shipments. The average price per ton, though, for 1914 has been exceeded only in 1907, 1908, and 1909. The shipments of mill stock in 1914 were 92,394 tons, a decrease of 29·6 per cent from 1913 shipments. The average price realized on 1914 mill stock, \$22.94 per ton, was higher than that of the three preceding years.

Tables showing yearly shipments of asbestos, both crude and milled, and of asbestos of all grades, and asbestic follow:—

Annual Shipments of Crude and Mill Stock Asbestos, 1903-14.

| Calendar Year. | CRUDE. | | | MILL STOCK. | | |
|----------------|-------------|---------|----------|-------------|-----------|----------|
| | Short tons. | Value. | Per ton. | Short tons. | Value. | Per ton. |
| | | \$ | \$ cts. | | \$ | \$ cts. |
| 1903..... | 3,134 | 361,867 | 115 46 | 27,995 | 554,021 | 19 79 |
| 1904..... | 4,410 | 534,874 | 121 28 | 31,201 | 678,628 | 21 75 |
| 1905..... | 3,767 | 472,859 | 125 53 | 46,902 | 1,013,500 | 21 61 |
| 1906..... | 3,841 | 635,345 | 165 41 | 56,920 | 1,401,083 | 24 61 |
| 1907..... | 4,327 | 830,632 | 191 97 | 57,803 | 1,654,135 | 28 62 |
| 1908..... | 3,345·5 | 669,232 | 200 04 | 63,202 | 1,886,129 | 29 84 |
| 1909..... | 3,074·3 | 575,510 | 187 20 | 60,275 | 1,709,077 | 28 35 |
| 1910..... | 3,740 | 664,508 | 177 66 | 73,768 | 1,891,466 | 25 64 |
| 1911..... | 4,864·1 | 744,962 | 153 15 | 96,529 | 2,177,100 | 22 55 |
| 1912..... | 5,662·9 | 890,351 | 157 23 | 105,898 | 2,227,221 | 21 03 |
| 1913..... | 5,660·3 | 989,162 | 174 75 | 131,291 | 2,841,747 | 21 64 |
| 1914..... | 4,147·9 | 773,193 | 186 42 | 92,394 | 2,119,073 | 22 94 |

Annual Shipments of Asbestos and Asbestic.

| Calendar Year. | ASBESTOS. | | | ASBESTIC. | | |
|----------------|-------------|-----------|----------|-------------|--------|----------|
| | Short tons. | Value. | Per ton. | Short tons. | Value. | Per ton. |
| | | \$ | \$ cts. | | \$ | \$ cts. |
| 1880 (a)..... | 380 | 24,700 | 65 00 | | | |
| 1881 (a)..... | 540 | 35,100 | 65 00 | | | |
| 1882 (a)..... | 810 | 52,650 | 65 00 | | | |
| 1883 (a)..... | 955 | 68,750 | 71 99 | | | |
| 1884 (a)..... | 1,141 | 75,097 | 65 82 | | | |
| 1885 (a)..... | 2,440 | 142,441 | 58 38 | | | |
| 1886 (a)..... | 3,458 | 206,251 | 59 64 | | | |
| 1887..... | 4,619 | 226,976 | 48 92 | | | |
| 1888..... | 4,404 | 255,007 | 57 90 | | | |
| 1889..... | 6,113 | 426,554 | 69 78 | | | |
| 1890..... | 9,860 | 1,260,240 | 127 81 | | | |
| 1891..... | 9,279 | 999,878 | 107 76 | | | |
| 1892..... | 6,082 | 390,462 | 64 20 | | | |
| 1893..... | 6,331 | 310,156 | 86 81 | | | |
| 1894..... | 7,630 | 420,825 | 55 15 | | | |
| 1895..... | 8,756 | 368,175 | 42 05 | | | |
| 1896..... | 10,892 | 423,066 | 38 84 | 1,358 | 6,790 | 5 00 |
| 1897..... | 13,202 | 399,528 | 29 99 | 17,240 | 45,840 | 2 66 |
| 1898..... | 16,124 | 475,131 | 29 47 | 7,661 | 16,066 | 2 10 |
| 1899..... | 17,790 | 468,635 | 26 34 | 7,746 | 17,214 | 2 22 |
| 1900..... | 21,621 | 729,886 | 33 76 | 7,520 | 18,545 | 2 47 |
| 1901..... | 32,892 | 1,248,645 | 37 96 | 7,325 | 11,114 | 1 52 |
| 1902..... | 30,219 | 1,126,688 | 37 28 | 10,197 | 21,631 | 2 20 |
| 1903..... | 31,129 | 915,888 | 29 42 | 10,548 | 13,869 | 1 31 |
| 1904..... | 35,611 | 1,213,502 | 34 08 | 12,854 | 12,850 | 1 00 |
| 1905..... | 50,669 | 1,486,359 | 29 33 | 17,594 | 16,900 | 0 96 |
| 1906..... | 60,761 | 2,036,428 | 33 52 | 21,424 | 23,715 | 1 11 |
| 1907..... | 62,130 | 2,484,767 | 39 99 | 28,296 | 20,275 | 0 72 |
| 1908..... | 66,548 | 2,555,361 | 38 40 | 24,225 | 17,974 | 0 74 |
| 1909..... | 63,349 | 2,284,587 | 36 06 | 23,951 | 17,188 | 0 72 |
| 1910..... | 77,508 | 2,555,974 | 32 98 | 24,707 | 17,629 | 0 71 |
| 1911..... | 101,393 | 2,922,062 | 28 82 | 26,021 | 21,046 | 0 81 |
| 1912..... | 111,561 | 3,117,572 | 27 95 | 24,740 | 19,707 | 0 80 |
| 1913..... | 136,951 | 3,830,909 | 27 97 | 24,135 | 19,016 | 0 79 |
| 1914..... | 96,542 | 2,892,266 | 29 96 | 21,031 | 17,540 | 0 83 |

(a) Exports.

EXPORTS AND IMPORTS.

From 1903 to 1914 inclusive the exports of asbestos from Canada have been 86.15 per cent of the total shipments. The exports to Great Britain, United States, Germany, and to other countries during recent years are shown in the following table. Not all the asbestos consumed by each country mentioned is imported directly, a great deal of the European demands being supplied through United States firms, and a great deal of the German and Austrian demands through Belgium, Holland, and Italy. Asbestic sand is not included in the following tables; of this there was exported 18,991 tons valued at \$108,548 in 1914, and 24,766 tons valued at \$138,737 in 1913.

Exports of Canadian Asbestos by Countries, 1903-1914.

| CALENDAR YEAR | TO GREAT BRITAIN. | | TO UNITED STATES. | | TO GERMANY. | | TO OTHER COUNTRIES. | | TOTAL EXPORTS. | | Value per ton. |
|---------------|-------------------|---------|-------------------|-----------|-------------|---------|---------------------|---------|----------------|-----------|----------------|
| | Tons. | Value. | Tons. | Value. | Tons. | Value. | Tons. | Value. | Tons. | Value. | |
| | | \$ | | \$ | | \$ | | \$ | | \$ | \$ cts. |
| 1903... | 2,743 | 40,120 | 24,252 | 714,781 | 1,429 | 25,150 | 3,356 | 110,982 | 31,780 | 891,033 | 28 04 |
| 1904... | 6,602 | 210,175 | 25,957 | 762,300 | 2,463 | 94,141 | 2,250 | 94,271 | 37,272 | 1,160,887 | 31 15 |
| 1905... | 9,731 | 305,056 | 29,696 | 811,080 | 2,969 | 100,061 | 4,635 | 169,918 | 47,031 | 1,386,115 | 29 47 |
| 1906... | 9,435 | 318,313 | 39,767 | 1,058,513 | 3,654 | 82,117 | 6,998 | 230,314 | 59,854 | 1,689,257 | 28 22 |
| 1907... | 5,432 | 200,909 | 44,861 | 1,312,582 | 225 | 8,195 | 6,235 | 147,613 | 56,753 | 1,669,299 | 29 41 |
| 1908... | 5,221 | 288,290 | 50,503 | 1,314,337 | 341 | 9,470 | 5,145 | 230,666 | 61,210 | 1,842,763 | 30 11 |
| 1909... | 5,227 | 204,978 | 45,675 | 1,243,795 | 693 | 17,706 | 5,376 | 263,378 | 56,971 | 1,729,857 | 30 36 |
| 1910... | 6,700 | 280,452 | 57,939 | 1,505,477 | 440 | 15,925 | 6,406 | 306,778 | 71,485 | 2,108,632 | 29 50 |
| 1911... | 7,511 | 192,993 | 62,551 | 1,732,541 | 361 | 20,494 | 4,697 | 121,231 | 75,120 | 2,067,259 | 27 52 |
| 1912... | 9,387 | 208,464 | 69,222 | 1,871,770 | 1,155 | 43,898 | 8,244 | 225,221 | 88,008 | 2,349,353 | 26 69 |
| 1913... | 7,220 | 211,861 | 78,157 | 2,120,314 | 840 | 36,491 | 17,595 | 479,381 | 103,812 | 2,848,047 | 27 43 |
| 1914... | 11,197 | 382,482 | 58,302 | 1,555,339 | 2,749 | 94,967 | 8,833 | 265,858 | 81,081 | 2,298,646 | 28 35 |

The next table shows the aggregate exports of asbestos from 1892 to 1914. The 1914 exports were exceeded only by those in 1912 and 1913.

Annual Exports of Asbestos, Calendar Years 1892-1914.

| Calendar Year. | Tons. | Value. | Value per ton. | Calendar Year. | Tons. | Value. | Value per ton. |
|----------------|--------|-----------|----------------|----------------|---------|-----------|----------------|
| | | \$ | \$ cts. | | | \$ | \$ cts. |
| 1892..... | 5,380 | 373,103 | 69 35 | 1903..... | 31,780 | 891,033 | 28 04 |
| 1893..... | 5,917 | 338,707 | 57 24 | 1904..... | 37,272 | 1,160,887 | 31 14 |
| 1894..... | 7,987 | 477,837 | 59 82 | 1905..... | 47,031 | 1,386,115 | 29 47 |
| 1895..... | 7,442 | 421,690 | 56 66 | 1906..... | 59,854 | 1,689,257 | 28 22 |
| 1896..... | 11,842 | 567,967 | 47 96 | 1907..... | 56,753 | 1,669,299 | 29 41 |
| 1897..... | 15,570 | 473,274 | 30 40 | 1908..... | 61,210 | 1,842,763 | 30 11 |
| 1898..... | 15,346 | 494,012 | 32 19 | 1909..... | 56,971 | 1,729,857 | 30 36 |
| 1899..... | 17,883 | 473,148 | 26 46 | 1910..... | 71,485 | 2,108,632 | 29 50 |
| 1900..... | 16,993 | 693,105 | 39 61 | 1911..... | 75,120 | 2,067,259 | 27 52 |
| 1901..... | 32,269 | 1,069,918 | 33 16 | 1912..... | 88,008 | 2,349,353 | 26 69 |
| 1902..... | 31,074 | 995,071 | 32 02 | 1913..... | 103,812 | 2,848,047 | 27 43 |
| | | | | 1914..... | 81,081 | 2,298,646 | 28 35 |

Canada, though the leading country in the world in the production of asbestos, does not yet manufacture all the asbestos goods needed to supply the domestic market. Consequently, there is a considerable importation annually of asbestos goods under the Customs classification of "Asbestos in any form other than crude, and all manufactures thereof," the duty being 25 per cent. The 1914 imports were valued at \$282,053, those of 1913 at \$520,082, and those of 1912 at \$461,449.

Annual Imports of Asbestos 1885-1914.

| Fiscal Year. | Value. | Fiscal Year. | Value. | Fiscal Year. | Value. |
|--------------|--------|--------------|--------|------------------|---------|
| | \$ | | \$ | | \$ |
| 1885..... | 674 | 1895..... | 26,094 | 1905..... | 116,836 |
| 1886..... | 6,831 | 1896..... | 23,900 | 1906..... | 137,974 |
| 1887..... | 7,836 | 1897..... | 19,032 | 1907 (9 mos.)... | 127,509 |
| 1888..... | 8,793 | 1898..... | 26,389 | 1908..... | 190,980 |
| 1889..... | 9,943 | 1899..... | 32,607 | 1909..... | 180,598 |
| 1890..... | 13,250 | 1900..... | 43,455 | Calendar Year. | |
| 1891..... | 13,298 | 1901..... | 50,829 | 1910..... | 230,849 |
| 1892..... | 14,090 | 1902..... | 52,464 | 1911..... | 319,815 |
| 1893..... | 19,181 | 1903..... | 75,465 | 1912..... | 461,449 |
| 1894..... | 20,021 | 1904..... | 83,827 | 1913..... | 520,082 |
| | | | | 1914*..... | 282,053 |

*Asbestos in any form other than crude, and all manufactures of. Duty 25 per cent.

The imports of asbestos into the United Kingdom are of interest as indicating the market in that country, and the sources from which it is supplied. From 1907 to 1912 inclusive the imports ranged between a low limit of 6,477 and a high limit of 8,620 tons. In 1913 there was a sudden increase to 12,995 tons, and in 1914 a further increase to 16,480 tons. Except in the years 1909, 1911, and 1912 direct imports from Canada comprised over 50 per cent of the total, and in 1914 they reached the proportion of 68·7 per cent of the total imports.

Statistics as to these imports, indicating the sources of supply, appear in the following table.

Imports of Raw Asbestos into the United Kingdom.*

| Country. | 1912. | | 1913. | | 1914. | |
|--------------------------------|-------------|---------|-------------|---------|-------------|---------|
| | Short tons. | Value. | Short tons. | Value. | Short tons. | Value. |
| | | \$ | | \$ | | \$ |
| Russia..... | 2,170 | 267,477 | 1,770 | 218,966 | 1,403 | 140,072 |
| Germany..... | 203 | 24,903 | 392 | 40,836 | 296 | 44,160 |
| Portuguese East Africa..... | 32 | 1,465 | 216 | 19,773 | 329 | 28,446 |
| Italy..... | 44 | 7,076 | 101 | 12,653 | 84 | 21,131 |
| United States..... | 1,201 | 30,100 | 1,239 | 27,599 | 1,800 | 80,704 |
| Other foreign countries..... | 117 | 7,762 | 174 | 11,992 | 172 | 13,067 |
| Total foreign..... | 3,767 | 338,783 | 3,892 | 331,819 | 4,084 | 327,580 |
| Cape of Good Hope..... | 692 | 47,596 | 635 | 41,148 | 932 | 91,868 |
| Natal..... | | | 5 | 453 | 80 | 9,169 |
| Canada..... | 4,146 | 195,426 | 8,443 | 359,943 | 11,326 | 448,449 |
| Other British possessions..... | 15 | 852 | 20 | 1,324 | 58 | 3,849 |
| Total British possessions..... | 4,853 | 243,874 | 9,103 | 402,868 | 12,396 | 553,335 |
| Grand total..... | 8,620 | 582,657 | 12,995 | 734,687 | 16,480 | 880,915 |

*British Trade Report.

Following is a list of the firms reporting production of asbestos during 1914.

| Operator and Head Office Address. | Name of Mine. | LOCATION. | | Mine Office. |
|--|-------------------|---------------|----------------|-----------------|
| | | Township. | Range and Lot. | |
| Asbestos Corp. of Canada, Limited, 263 St. James St., Montreal, Can..... | Kings..... | Thetford.... | V 26; VI 26. | Thetford Mines. |
| | Beaver..... | Coleraine.... | C 31, 32..... | " |
| | British Canadian. | " | Black Lake.. | Black Lake. |
| Bell Asbestos Mines, Thetford Mines, Que.. | Bell..... | Thetford.... | V N-E½ 27.. | Thetford Mines. |
| Black Lake Asbestos and Chrome Co., Ltd., 60 Victoria, Toronto..... | Union..... | | | |
| | Imperial..... | Coleraine.... | B 27, 28..... | Black Lake. |
| | Southwark..... | | | |
| Jacobs Asbestos Mining Co. of Thetford, Ltd., 282 St. Catherine W. Montreal... | Jacobs..... | Thetford.... | VI 28..... | Thetford Mines. |
| Johnson's (Asbestos) Company, Thetford, Mines, Que..... | Johnson..... | Thetford.... | VI 27..... | Black Lake. |
| | Johnson..... | Coleraine.... | B 27..... | Thetford Mines. |
| Ling Asbestos Company, Ltd., East Broughton, Que..... | Ling..... | Broughton.. | VI 13b..... | East Broughton. |
| The Asbestos and Asbestic Co., Ltd., Asbestos, Que..... | Jeffrey..... | Shipton.... | III 8, 9, 10.. | Asbestos.... |
| The B. and A. Asbestos Company, Robertsonville, Que..... | B. and A..... | Thetford.... | V 9..... | Robertsonville. |
| The Martin-Bennett Asbestos Mines, Ltd., Thetford, Mines, Que..... | Ward-Ross..... | Thetford.... | V 27..... | Thetford Mines. |

BARYTES AND STRONTIUM.

BARYTES.

During recent years the only barytes deposit worked in Canada is one at Lake Ainslie, Inverness county, N. S., (Post Office, Scotsville), owned by Barytes, Limited, of Halifax, N. S. Another deposit which may become a producer, is located on Mining Claim R. S. C. 216, Langmuir township, near Porcupine, Ontario.

The 1914 shipments of ground barytes are reported as 612 tons valued at \$6,169, as compared with 641 tons in 1913 valued at \$6,410 and 464 tons in 1912 valued at \$5,104. During the last five years practically all the Canadian production finds a domestic market. Statistics of annual production and exports of barytes follow:—

Annual Production of Barytes.

| Calendar Year. | Tons. | Value. | Average Value. | Calendar Year. | Tons. | Value. | Average Value. |
|----------------|-------|--------|----------------|----------------|-------|--------|----------------|
| | | \$ | \$ cts. | | | \$ | \$ cts. |
| 1885..... | 300 | 1,500 | 5 00 | 1900..... | 1,337 | 7,605 | 5 69 |
| 1886..... | 3,864 | 19,270 | 4 98 | 1901..... | 653 | 3,842 | 5 89 |
| 1887..... | 400 | 2,400 | 6 00 | 1902..... | 1,096 | 3,957 | 3 61 |
| 1888..... | 1,100 | 3,850 | 3 50 | 1903..... | 1,163 | 3,931 | 3 38 |
| 1889..... | | | | 1904..... | 1,382 | 3,702 | 2 68 |
| 1890..... | 1,842 | 7,543 | 4 09 | 1905..... | 3,360 | 7,500 | 2 23 |
| 1891..... | | | | 1906..... | 4,000 | 12,000 | 3 00 |
| 1892..... | 315 | 1,260 | 4 00 | 1907..... | 1,344 | 3,000 | 2 23 |
| 1893..... | | | | 1908..... | 4,312 | 19,021 | 4 41 |
| 1894..... | 1,081 | 2,830 | 2 62 | 1909..... | 179 | 1,120 | 6 26 |
| 1895..... | | | | 1910..... | | | |
| 1896..... | 145 | 715 | 4 93 | 1911..... | 50 | 400 | 8 00 |
| 1897..... | 571 | 3,060 | 5 36 | 1912..... | 464 | 5,104 | 11 00 |
| 1898..... | 1,125 | 5,533 | 4 92 | 1913..... | 641 | 6,410 | 11 00 |
| 1899..... | 720 | 4,402 | 6 11 | 1914..... | 612 | 6,169 | 10 08 |

Exports of Barytes.

| Calendar Year. | Cwt. | Value. | Calendar Year. | Cwt. | Value. |
|----------------|--------|--------|----------------|-------|--------|
| | | \$ | | | \$ |
| 1901..... | 208 | 3,820 | 1908..... | 3,509 | 13,690 |
| 1902..... | | | 1909..... | | |
| 1903..... | 406 | 368 | 1910..... | 5 | 150 |
| 1904..... | 13,080 | 5,178 | 1911..... | | |
| 1905..... | 34,488 | 14,343 | 1912..... | 68 | 114 |
| 1906..... | 1,350 | 6,750 | 1913..... | Nil. | |
| 1907..... | 550 | 2,750 | 1914..... | Nil. | |

Imports of barytes have not been separately shown in the Customs Department classification since 1890, but certain barium compounds are

specifically mentioned. Imports of barium peroxide for the manufacture of hydrogen peroxide for the last nine months of 1913 were 26 tons valued at \$3,600, and for 1914 were 42 tons valued at \$5,722. Imports of blanc fixé (artificial sulphate of barium) and satin white again showed an increase being 1,854 tons valued at \$39,849 as compared with 1,698 tons in 1913 valued at \$38,043.

Statistics of imports appear in the following tables.

Imports of Barytes.

| Fiscal Year. | Cwt. | Value. | Fiscal Year. | Cwt. | Value. |
|--------------|-------|--------|--------------|-------|--------|
| | | \$ | | | \$ |
| 1880..... | 2,230 | 1,525 | 1886..... | | 62 |
| 1881..... | 3,740 | 1,011 | 1887..... | 379 | 676 |
| 1882..... | 497 | 303 | 1888..... | 236 | 214 |
| 1883..... | | 185 | 1889..... | 1,332 | 987 |
| 1884..... | | 229 | 1890..... | 1,322 | 978 |
| 1885..... | 7 | 14 | | | |

Imports of Blanc Fixé and Satin White.

| Calendar Year. | Tons. | Value. \$ | Average. \$ cts. |
|----------------|-------|--------------|---------------------|
| 1910..... | 1,016 | 22,726 | 22 37 |
| 1911..... | 1,315 | 29,796 | 22 66 |
| 1912..... | 1,635 | 34,794 | 21 28 |
| 1913..... | 1,698 | 38,043 | 22 40 |
| 1914..... | 1,854 | 39,849 | 21 49 |

STRONTIUM.

Strontium minerals have not been mined in Canada, but in view of enquiry that has recently been made, the accompanying notes respecting Canadian occurrences of this mineral may be of interest.

Certain manufacturers of paints and varnishes appear to be of the opinion that strontium sulphate if obtainable at suitable prices might be substituted for sulphate of barium of which it is claimed there is a consumption in Great Britain of from 50,000 to 100,000 tons per annum at prices ranging from 40s. to 60s. and 70s. per ton.

The principal use of strontium in the form of strontium nitrate has been in the manufacture of signal lights and fireworks. Strontium hydroxide has also been extensively used, more particularly in Germany, in the refining of beet sugar molasses.

The occurrence of strontianite and celestite has been noted at several places in Canada, but in most cases apparently of mineralogical interest only.

The various occurrences that have been recorded are listed below. The veins of celestite found in the counties of Frontenac, Leeds, and Ren-

frew, Ontario, might be worthy of investigation as possible sources of supply should a demand for this mineral arise.

Nova Scotia.

Cape Breton. Sydney river. Dominion Steel Co's dam.

Celestite occurs in a 12 inch bed at this place, the only locality in the province.

(Nova Scotia Mines Report 1903—p. 39).

Quebec.

St. Helens Island.

Strontianite occurs in the form of white fibrous tufts in cracks in concretionary limestone masses in the Utica slate of St. Helens Island, Montreal.

(Geol. Survey of Canada, 1888-89—61T).

Ontario.

Carleton county. Nepean Tp. Con. A, lot 31.

On the south shore of the Ottawa river a short distance below the road leading down to the old Skead mill, strontianite occurs in the form of veins traversing the lower part of the Chazy limestone, which vary from four to six inches in width. The mineral occurs below high water line and thus can only be seen at a low stage of water.

An analysis of carefully selected material consisting of crystals dried at 100C gave:—

| | |
|--------------------|--------|
| Carbonic acid..... | 30·54% |
| Strontia..... | 65·43% |
| Lime..... | 3·38% |
| Insoluble..... | 0·17% |

(G.S.C. 1899—44G).

99·52%

Essex county. Amherstburg.

Specimens of celestite were obtained in the course of excavating the bed of the Detroit river at Amherstburg.

(G.S.C. 1904—347A).

Frontenac county. Loughboro Tp., Con. XII, S. $\frac{1}{2}$ lot 5.

Sufficient development work is said to have been done on this property to give assurance that the celestite occurs in considerable quantity and an analysis of a fair sample showed 94·1 per cent pure strontium sulphate. There was said to be 50 tons of mineral on the dump at this place in 1907.

Grenville county. Oxford Tp.

Samples of barytocelestite brought to Mines Branch reported as having been obtained near Burritts Rapids on the Rideau river.

Leeds county. Lansdowne Tp., Con. VIII, lot 2.

Celestite has been found in considerable abundance in a well-defined vein traversing crystalline limestone on this lot. The vein is said to have been traced for a quarter of a mile running nearly due north-west and south-east, and to have an average width of about two feet. In some parts it consists wholly of nearly pure celestite, whilst in other parts this mineral associated with celestite constitutes the gangue through which galena is irregularly distributed in crystals and small masses.

An analysis of a sample showed the following composition:—

| | |
|---------------------|--------|
| Sulphuric acid..... | 43·51% |
| Strontia..... | 56·31% |
| Baryta..... | trace. |
| Lime..... | 0·11% |
| | <hr/> |
| | 99·93% |

— (G.S.C. 1894—10R).

Manitoulin Island. East side of Manitowaning bay, and at Cape Robert, Grand Manitoulin Island, and on Bayard Island.

Celestite specimens were collected by Dr. Robert Bell in 1865.

— (G.S.C. 1899—19R).

Prescott county. Hawkesbury East Tp.

A specimen of celestite from the Little Rideau river was submitted by Thos. Ross of Little Rideau in 1900.

— (G.S.C. 1900—174A).

Renfrew county. Bagot Tp. Con. X, lot 7.

Massive celestite is met with forming a vein traversing Laurentian strata. The vein which has been traced for over two hundred yards, has been stripped at several points along its course for a distance of some sixty feet and found to have a width of from eight to ten feet. There are also indications it is said of the existence of another vein of this mineral running parallel with and not far removed from this one. An analysis of a sample from this locality gave the following results:—

| | |
|-------------------------|---------|
| Strontium sulphate..... | 85·63 % |
| Barium..... | 14·38% |
| Calcium..... | trace. |
| | <hr/> |
| | 100·01% |

— (G.S.C. 1893—19R).

British Columbia.

Cariboo District. Horsefly river.

Horsefly Hydraulic Mining Co's property.

Strontianite occurs incrusting boulders or filling irregular cavities in the lower or cemented portion of the auriferous gravels and is also found disseminated in hard clayey concretionary masses formed beneath the auriferous gravels in the decomposed superficial parts of the underlying Tertiary (Miocene) shales which constitute the bed rock at this mine.

(G.S.C. 1892-93—30R).

CALCIUM CARBIDE AND CYANAMID.

Although this report deals primarily with mineral resources, brief reference may be made to certain products in the manufacture of which the mining industry is directly interested.

CALCIUM CARBIDE.

Calcium carbide, which is made in electric furnaces from lime and coke, is manufactured in several plants in Ontario and Quebec. These include: The Union Carbide Company, Welland, Ont. The Canada Carbide Company, Merritton, Ont., and Shawenegan Falls, Que.

CYANAMID.

The fixation of atmospheric nitrogen which is accomplished in the manufacture of cyanamid has had commercial application for the past ten years. In Canada cyanamid has been manufactured by the American Cyanamid Company, at Niagara Falls, Ont., since January of 1910. We are informed by the Company, whose head office is at Nashville, Tenn., that on December 31, 1914, the capacity of the plant at Niagara Falls, Ont., was 64,000 tons of cyanamid per annum, this representing an increase of approximately 54,000 tons over the capacity of the initial plant at Niagara Falls, which started commercial operations during the month of January 1910. The actual production during the twelve months ended December 1914, fell somewhat short of capacity, due in part to the fact that some of the plant extensions were not completed and placed in operation until the middle of the year, and in part to curtailment of operations during the latter half of the year, owing to conditions brought on by the European war.

Cyanamid as defined by Pranke¹ is a trade name for the completely hydrated material prepared for use as a fertilizer; it contains about 45 per cent calcium cyanamide (CaCN_2), 27 per cent calcium hydroxide and no carbide.

As briefly described by Pranke: "The first step in the manufacture of commercial cyanamid is the preparation of calcium carbide. This is brought about in the usual manner by fusing in an electric furnace a mixture of lime and coke.

"The carbide is removed from the furnace at regular intervals, is cooled, crushed to a fine powder, and packed in the nitrifying ovens. These are cylindrical, perforated steel cans, set in heat-insulated brick ovens. A carbon pencil through the axis of the can is used to heat the carbide to the combining temperature. On admission of the nitrogen to the cans the following reaction takes place:

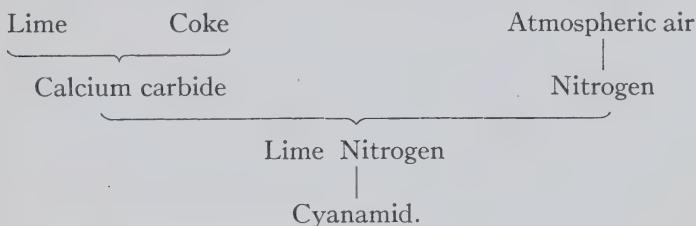


¹ "Cyanamid, Manufacture, Chemistry and Uses."

"Nitrogen is obtained either by fractional distillation of liquid air, or by means of the copper oxide process. In the latter, air is passed through a red-hot mass of finely divided copper, suspended in asbestos or other inert material. The copper combines with the oxygen and allows the nitrogen to pass through. The copper oxide is easily recovered for use by reduction in situ with a suitable gas, such as natural gas."

The following notes respecting the Niagara Falls plant are taken from a description¹ published in "Metallurgical and Chemical Engineering:"

"The whole operation may be concisely sketched as follows:



"The manufacture of calcium carbide is carried out in continuous operation in eight 20-ton 3,000-h.p. three-phase electric furnaces, each with three large carbon electrodes at the top.

"The lime plant consists of twelve Doherty-Eldred limekilns, equipped with the Eldred process and operated with induced draught. The first installation comprised six kilns and six more were erected last year."

For the production of nitrogen from the air, two different processes are being used at Niagara.

"The newer method, installed for the latest extension of the plant last year, uses liquid air produced by the Claude process. The oxygen is separated from the nitrogen by fractional distillation of the liquid air.

"The older method used is the so-called copper sponge method, in which retorts filled with copper sponge are employed. When a series of these retorts is heated and air blown through the copper sponge, the oxygen of the air combines with the copper, forming cupric oxide and leaving the nitrogen free. The flow of air is then diverted to a second series of heated retorts, also containing copper sponge, while coal gas is passed through the first series of retorts so as to reduce the cupric oxide to copper sponge. This is then used again for combining with the oxygen in a fresh amount of air and setting the nitrogen free, and so on. The process is therefore cyclic."

The coal gas plant has a capacity of 500,000 cubic feet per 24 hours and as will be seen from the above description, serves a double purpose, providing coke for the carbide manufacture and coal gas for the reduction of cupric oxide in the separation of nitrogen gas from atmospheric air.

The standard coal gas process is not used. The retort benches are run very hot to produce a gas rich in hydrogen, and coke low in volatile matter.

¹ "Metallurgical and Chemical Engineering," New York, April 1915, p. 218.

The nitrification of the carbide is carried out in individual ovens holding from $\frac{1}{2}$ to $2\frac{1}{2}$ tons of carbide. The product recovered from these ovens is a black hard coke, which analyses 22 per cent nitrogen and about 1 per cent unnitrified carbide. This material is called lime-nitrogen and in preparation for agricultural purposes is finely ground and partly hydrated to insure decomposition of the carbide it contains, and is then oiled to render it dustless, and stored in bulk or packed immediately into sacks and shipped to the fertilizer mixer.

*Argon Gas from Cyanamid.*¹

"Quite recently the American Cyanamid Company has been using the "cyanamid" process as a means of producing argon gas in quantities, producing the nitrogen by means of the copper process and later eliminating the nitrogen by continued reabsorption in the cyanamid ovens leaving argon as the final gas. Thousands of feet of this gas, highly concentrated, is being sold to the lamp industry, chiefly for American use, but in part to consumers abroad at the home of the chemical industry."

¹"The Cyanamid Process," by Frank S. Washburn, Transactions American Electrochemical Society, 1915.

CHROMITE.

The production of chromite has been confined to the vicinity of Black Lake and Coleraine, Megantic county, Quebec. No ore has been mined since 1909, though shipments have been made from stock in 1910, 1911, and 1914.

Late in 1914 one of the previous operators, The Black Lake Asbestos and Chrome Company, commenced some exploratory work at one of its properties. The Dominion Chrome Company made a shipment of 136 tons of ore from stock to Windsor Mills, Quebec.

Statistics of production from 1886 are shown in the following table. Material classed as high grade includes both ore and concentrates ranging from 48 per cent upwards in Cr_2O_3 while low grade composed chiefly of crude ore, includes all running below 48 per cent in Cr_2O_3 .

Annual Production of Chromite in Canada, 1886-1914.

| Calendar Year. | HIGH GRADE. | | | LOW GRADE. | | | TOTAL. | | |
|-------------------|-------------|--------|----------------|-------------|--------|----------------|-------------|--------|----------------|
| | Short tons. | Value. | Average price. | Short tons. | Value. | Average price. | Short tons. | Value. | Average price. |
| | | \$ | \$ cts. | | \$ | \$ cts. | | \$ | \$ cts. |
| 1886..... | | | | | | | 60 | 945 | 15 75 |
| 1887..... | | | | | | | 38 | 570 | 15 00 |
| 1888 to 1893..... | | | | | | | No output | | |
| 1894..... | | | | | | | 1,000 | 20,000 | 20 00 |
| 1895..... | | | | | | | 3,177 | 41,300 | 13 00 |
| 1896..... | | | | | | | 2,342 | 27,004 | 11 53 |
| 1897..... | | | | | | | 2,637 | 32,474 | 12 31 |
| 1898..... | | | | | | | 2,021 | 24,252 | 12 00 |
| 1899..... | | | | | | | 2,010 | 21,842 | 10 86 |
| 1900..... | | | | | | | 2,335 | 27,000 | 11 56 |
| 1901..... | | | | | | | 1,274 | 16,744 | 13 14 |
| 1902..... | | | | | | | 900 | 13,000 | 14 44 |
| 1903..... | 2,842 | 44,280 | 15 58 | 667 | 6,849 | 20 17 | 3,509 | 51,129 | 14 57 |
| 1904..... | 4,650 | 53,976 | 16 08 | 1,424 | 13,170 | 9 25 | 6,074 | 67,146 | 11 05 |
| 1905..... | | | | 8,575 | 93,301 | 10 88 | 8,575 | 93,301 | 10 88 |
| 1906..... | 4,975 | 57,484 | 11 55 | 4,060 | 34,375 | 8 47 | 9,035 | 91,859 | 10 17 |
| 1907..... | 3,545 | 41,931 | 11 83 | 3,651 | 30,970 | 8 48 | 7,196 | 72,901 | 10 13 |
| 1908..... | 3,472 | 45,300 | 13 05 | 3,753 | 36,708 | 9 78 | 7,225 | 82,008 | 11 35 |
| 1909..... | 54 | 720 | 13 33 | 2,416 | 25,884 | 10 71 | 2,470 | 26,604 | 10 77 |
| 1910..... | 25 | 430 | 17 20 | 274 | 3,304 | 12 06 | 299 | 3,734 | 12 49 |
| 1911..... | 137 | 2,327 | 16 98 | 20 | 260 | 13 00 | 157 | 2,587 | 16 48 |
| 1912..... | | | | | | | | | |
| 1913..... | | | | | | | | | |
| 1914..... | | | | 136 | 1,210 | 8 90 | 136 | 1,210 | 8 90 |

A table of imports of Canadian chromite into the United States from 1904-1914, and a table showing the total United States imports of chromium of recent years, with sources of the same follow.

Imports of Chromite into the United States from Canada.¹

| Twelve months ending June 30. | Short tons. | Value. | Twelve months. ending June 30. | Short tons. | Value. |
|----------------------------------|-------------|---------|-----------------------------------|-------------|--------|
| | | \$ | | | \$ |
| 1904..... | 2,790 | 36,322 | 1909..... | 4,455 | 50,042 |
| 1905..... | 6,489 | 70,934 | 1910..... | 269 | 2,892 |
| 1906..... | 9,951 | 107,580 | 1911..... | 17 | 150 |
| 1907..... | 6,179 | 66,115 | 1912..... | 14½ | 258 |
| 1908..... | 6,505 | 69,009 | 1913..... | Nil. | ..... |
| | | | 1914..... | 597 | 9,283 |

¹ The Foreign Commerce and Navigation of the United States, Washington, long ton in original changed to short ton.

Imports of Chromite into the United States,¹ Years Ending June 30, 1913 and 1914.

| | 1913. | | | 1914. | | |
|------------------------|------------|---------|----------|------------|---------|----------|
| | Long tons. | Value. | Per ton. | Long tons. | Value. | Per ton. |
| | | \$ | \$ cts. | | \$ | \$ cts. |
| Portugal..... | 5,000 | 60,831 | 12 16 | ..... | ..... | ..... |
| Canada..... | ..... | ..... | ..... | 533 | 9,283 | 17 42 |
| French Oceania..... | 6,620 | 47,913 | 7 24 | 25,970 | 166,915 | 6 43 |
| Greece..... | ..... | ..... | ..... | 8,450 | 87,931 | 10 41 |
| British India..... | ..... | ..... | ..... | ..... | ..... | ..... |
| Japan..... | 322 | 2,712 | 8 42 | ..... | ..... | ..... |
| Netherlands..... | ..... | ..... | ..... | ..... | ..... | ..... |
| Portuguese Africa..... | 24,000 | 291,981 | 12 12 | 30,001 | 364,989 | 12 17 |
| Turkey in Asia..... | 13,830 | 100,227 | 7 25 | 14,830 | 107,292 | 7 23 |
| United Kingdom..... | ..... | ..... | ..... | 58 | 717 | 12 36 |
| Total..... | 49,772 | 503,664 | 10 12 | 79,842 | 737,127 | 9 23 |

¹ The Foreign Commerce and Navigation of the United States

COAL.

The term "production" in the text and tables of this report is used to represent the tonnage of coal actually sold, or used, by the producer, as distinguished from the term "output" which is applied to the total coal extracted from the mine, and which includes, in some cases, coal lost or unsaleable, or coal carried into stock on hand at the end of the year.

The total production of coal during 1914 was 13,637,529 short tons (12,176,365 long tons) valued at \$33,471,801, or an average of \$2.45 per ton. This coal was produced by 221 operating companies who employed an average of 27,571 men, and paid out in wages approximately \$19,060,011. The 1914 production, on comparison with that of 1913, which was 15,012,178 short tons (13,403,730 long tons) valued at \$37,334,940, shows a decrease of 1,374,649 tons, or 9.16 per cent. Compared with 1912 a decrease in production of 875,300 tons is shown; but the 1914 production is greater than that of any year prior to 1912. The values mentioned are partially estimated or assumed since complete returns have not been received with respect to amounts realized from coal sales. In the case of Nova Scotia an average value of \$2.50 per long ton is placed upon the total production, while for British Columbia an average value of \$3.50 per long ton is used. The values placed upon the Alberta production are those furnished by the operating companies.

The decrease of approximately 10 per cent in the production of 1914, as compared with that of 1913, is due chiefly to the unsettled industrial conditions existing generally throughout the Dominion, which were aggravated by the outbreak of the European war in August, and in a lesser degree to the decrease of ocean trade (particularly on the Pacific coast) during the first few months of the war, due to the presence of enemy cruisers on the high seas.

The total exports of domestic coal from Canada in 1914 were 1,423,126 tons valued at \$3,880,175 as compared with 1,562,020 tons valued at \$3,961,351 in 1913. There is also a small export of coal "not the produce of Canada".

The total imports of coal in 1914 were 14,721,057 tons valued at \$39,801,498, as compared with imports in 1913 of 18,201,953 tons valued at \$47,949,119.

The total consumption of coal in 1914 was 26,852,323 tons or 3.325 tons per capita, as compared with 31,582,545 tons, or 4.071 tons per capita in 1913.

According to statistics published by the Department of Railways and Canals, the total consumption of coal in locomotives for the year ending June 30, 1914, was 8,273,457 tons, as compared with a consumption of 9,045,625 tons for the previous year, a decrease of 8.5 per cent. The

consumption of oil for fuel in locomotives for the same year was 40,652,743 gallons, as compared with a consumption of 31,087,252 gallons for the previous year, an increase of 9,565,491 gallons or 30·7 per cent.

A statement prepared by the Department of Customs of "Imports of petroleum, crude, fuel, and gas oils ·8235 sp. gr. or heavier at 60°" into the Provinces of Manitoba, Saskatchewan, Alberta, and British Columbia, shows the aggregate imports for the fiscal years ending March 31, 1913, 1914, and 1915, to have been respectively, 82,589,680 gallons, 112,839,526 gallons, and 111,604,186 gallons.

These statements do not cover exactly the same periods, yet it would appear from the record given that only about one-third of the fuel oil imported is used in railway locomotives. Consequently the consumption of oil for fuel is evidently increasing very generally, and during the year ending March 31, 1915, fuel oil has probably displaced about 1,100,000 tons of coal of Nanaimo grade in the western markets, chiefly in British Columbia.

Almost all varieties of coal are produced in Canada. Bituminous coal constitutes by far the largest proportion of the annual production. Lignite only is produced in Saskatchewan, and in Alberta it forms a large proportion of the Province's production. Of anthracite there is an almost negligible amount, less than 200,000 tons annually from one mine, at Bankhead, Alberta.

Statistics of the production of coal by provinces in 1914 and 1913, and comparisons of 1914 production with that of 1913, and of the production of 1913 with that of 1912, are given in the tables following:—

Production of Coal by Provinces, 1914.

| Province. | Average No. of men employed. | Wages paid. | PRODUCTION OF COAL. | | Average value. per ton. | Per cent of total quantity. |
|-----------------------|------------------------------------|-------------|---------------------|------------|-------------------------------|-----------------------------------|
| | | | Short Tons. | Value. | | |
| | | \$ | | \$ | \$ cts. | |
| Nova Scotia..... | 14,080 | 8,270,869 | 7,370,924 | 16,452,955 | 2 23 | 54.05 |
| Alberta..... | 7,334 | 5,912,718 | 3,683,015 | 9,350,392 | 2 54 | 27.01 |
| British Columbia..... | 5,541 | 4,503,283 | 2,239,799 | 6,999,374 | 3 12 | 16.42 |
| Saskatchewan..... | 336 | 200,578 | 232,299 | 374,245 | 1 61 | 1.70 |
| New Brunswick..... | 236 | 138,547 | 98,049 | 241,075 | 2 46 | 0.72 |
| Yukon Territory..... | 44 | 34,016 | 13,443 | 53,760 | 4 00 | 0.10 |
| | 27,571 | 19,060,011 | 13,637,529 | 33,471,801 | 2 45 | 100.00 |

Production of Coal by Provinces, 1913.

| Province. | Average No. of men employed. | Wages paid. | PRODUCTION OF COAL. | | Average value per ton. | Per cent of total quantity. |
|-----------------------|------------------------------------|-------------|---------------------|------------|------------------------------|-----------------------------------|
| | | | Short Tons. | Value. | | |
| | | \$ | | \$ | \$ cts. | |
| Nova Scotia..... | 13,697 | 9,328,613 | 7,980,073 | 17,812,663 | 2 23 | 53.15 |
| Alberta..... | 7,509 | 6,811,372 | 4,014,755 | 10,418,941 | 2 59 | 26.75 |
| British Columbia..... | 6,162 | 5,587,145 | 2,714,420 | 8,482,562 | 3 12 | 18.08 |
| Saskatchewan..... | 350 | 205,970 | 212,897 | 358,192 | 1 68 | 1.42 |
| New Brunswick..... | 160 | 95,000 | 70,311 | 166,637 | 2 37 | 0.47 |
| Yukon Territory..... | 39 | 37,041 | 19,722 | 95,945 | 4 86 | 0.13 |
| | 27,917 | 22,065,141 | 15,012,178 | 37,334,940 | 2 49 | 100.00 |

Comparison of Production 1912 with 1913, and 1913 with 1914.

| Province. | (i) INCREASE OR (d) DECREASE. | | | |
|-----------------------|-------------------------------|-----------|----------------------|-----------|
| | Years 1912 and 1913. | | Years 1913 and 1914. | |
| | Tons. | Per cent. | Tons. | Per cent. |
| Nova Scotia..... | (i) 196,185 | 2.52 | (d) 609,149 | 7.63 |
| British Columbia..... | (d) 494,577 | 15.41 | (d) 474,621 | 17.48 |
| Alberta..... | (i) 774,178 | 23.89 | (d) 331,740 | 8.26 |
| Saskatchewan..... | (d) 12,445 | 5.52 | (i) 19,402 | 9.11 |
| New Brunswick..... | (i) 25,531 | 57.01 | (i) 27,738 | 39.45 |
| Yukon Territory..... | (i) 10,477 | 113.31 | (d) 6,279 | 31.94 |
| Total for Canada..... | (i) 499,349 | 3.44 | (d) 1,374,649 | 9.16 |

These tables show a decreased production for each producing province, except the Provinces of New Brunswick and Saskatchewan, the combined production of which is only about 2.50 per cent of Canada's total production.

The proportions of the total production contributed by the different provinces are almost identical with the proportions they contributed in 1913. Nova Scotia with a production of 609,149 tons less than in 1913, (a decrease of 7.6 per cent) heads the list of producers with 54.05 per cent

of the total. Alberta, with a decrease of 331,740 tons from 1913 production (equivalent to 8.2 per cent) maintains its position gained in 1912 of being the second largest producer. Its 1914 production of 3,683,015 tons is the second largest in its history. British Columbia production was 17.4 per cent less than in 1913, being 2,239,799 tons, the smallest production since the year 1906. In this Province all factors which affected the Canadian production were operative. The Saskatchewan production of 232,299 tons is an increase of 9.11 per cent over the 1913 production, and the New Brunswick production of 98,049 tons is an increase of 39.45 per cent over that of the previous year.

The relative importance of the different provinces as coal producers for a number of years past is shown in the next table, in which is set forth the proportional contribution of each province to the total tonnage of coal produced in Canada. The coal-fields on the Atlantic sea-board still continue to produce more than half the total, although from 1910 onwards the combined production of the western provinces has only been a little less than 50 per cent of the total.

| Province. | 1874. | 1890. | 1900. | 1905. | 1910. | 1911. | 1912. | 1913. | 1914. |
|-----------------------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| | % | % | % | % | % | % | % | % | % |
| Nova Scotia..... | 91 | 71 | 62.9 | 65.5 | 50.25 | 62.35 | 53.94 | 53.62 | 54.77 |
| New Brunswick..... | | | | | | | | | |
| Saskatchewan*..... | | | 0.7 | 1.2 | 1.40 | 1.83 | 1.55 | 1.42 | 1.70 |
| Alberta*..... | | 4 | 5.4 | 10.8 | 22.42 | 13.34 | 22.33 | 26.75 | 27.01 |
| British Columbia..... | 8 | 25 | 31.0 | 22.4 | 25.80 | 22.45 | 22.12 | 18.08 | 16.42 |
| Yukon Territory..... | | | | 0.1 | 0.13 | 0.03 | 0.06 | 0.13 | 0.10 |

*Alberta and Saskatchewan were established as provinces on September 1, 1905. For the purpose of comparison, the coal production during the years previous to that date has been separated according to the present boundaries of these Provinces.

The following tables show the production and the distribution of coal mined by provinces during recent years. The 1914 sales for Canadian consumption were 10,359,390 tons, a decrease of 1,022,570 tons from the 1913 sales, the sales for export to the United States were 1,181,536 tons, a decrease of 73,865 tons from the 1913 sales, and the sales for export to other countries were 239,927 tons, a decrease of 23,262 tons from the 1913 sales. The total sales of Canadian coal were 11,780,853 tons as compared with 12,900,550 tons in 1913. Upwards of 591,331 tons were used by colliery operators in the manufacture of briquettes and coke, in steel plants, and in brick plants, etc., the exact figure for that made into briquettes not being available; 1,265,345 tons were used in the operation of collieries, and by workmen. The loss due to breakage, washing, unmarketable stock, etc., so far as returns were furnished, was 434,337 tons. To arrive at the total Canadian output for 1914 there must be deducted from the aggregate of Canadian coal sold and used 83,123 tons, the decrease in quantity of coal in stock on December 31, as compared with the quantity in stock on January 1, which gives 13,988,743 tons as the 1914 output.

Production and Distribution of Coal Mined, by Provinces, 1914.

| | Nova Scotia. | New Brunswick. | Sas- katch- ewan. | Alberta. | Yukon. | British Col- umbia. | Total. |
|--|-----------------|-------------------|-------------------------|-----------|--------|---------------------------|------------|
| Sales in Canada..... | 5,851,735 | 94,455 | 217,898 | 3,218,234 | 7,547 | 969,521 | 10,359,390 |
| Sales for export to U.S.. | 399,533 | 1,185 | ..... | 105,699 | ..... | 675,119 | 1,181,536 |
| Sales for export to other countries..... | 239,927 | ..... | ..... | ..... | ..... | ..... | 239,927 |
| Total sales..... | 6,491,195 | 95,640 | 217,898 | 3,323,933 | 7,547 | 1,644,640 | 11,780,853 |
| Used by producers in making coke, steel, brick, etc..... | *145,915 | ..... | 3,050 | 44,249 | ..... | 398,117 | †591,331 |
| Used by producers for colliery consumption and by workmen..... | 733,814 | 2,409 | 11,351 | 314,833 | 5,896 | 197,042 | 1,265,345 |
| Total used..... | 879,729 | 2,409 | 14,401 | 359,082 | 5,896 | 595,159 | 1,856,676 |
| Production*..... | 7,370,924 | 98,049 | 232,299 | 3,683,015 | 13,443 | 2,239,799 | 13,637,529 |
| Stock on hand Jan. 1.... | 231,840 | 405 | ..... | 68,741 | 4,623 | 19,666 | 325,275 |
| Stock on hand Dec. 31.. | 138,774 | 1,596 | 6 | 53,545 | 4,645 | 43,586 | 242,152 |
| Difference..... | -93,066 | + 1,191 | + 6 | -15,196 | + 22 | +23,920 | -83,123 |
| Losses due to breakage or other causes..... | 170,184 | ..... | 7,995 | 75,853 | ..... | 180,305 | 434,337 |
| Total output..... | 7,448,042 | 99,240 | 240,300 | 3,743,672 | 13,465 | 2,444,024 | 13,988,743 |

*Production is obtained by adding coal sold and coal used. †Not complete.

Production and Distribution of Coal Mined, by Provinces, 1913.

| | Nova Scotia. | New Brunswick. | Sas- katch- ewan. | Alberta. | Yukon. | British Columbia. | Total. |
|--|-----------------|-------------------|-------------------------|-----------|--------|----------------------|------------|
| Sales in Canada..... | 6,269,722 | 68,311 | 195,954 | 3,527,772 | 8,558 | 1,311,643 | 11,381,960 |
| Sales for export to U.S.. | 417,035 | ..... | ..... | 139,536 | 10 | 698,820 | 1,255,401 |
| Sales for export to other countries..... | 263,189 | ..... | ..... | ..... | 0 | ..... | 263,189 |
| Total sales..... | 6,949,946 | 68,311 | 195,954 | 3,667,308 | 8,568 | 2,010,463 | 12,900,550 |
| Used by producers in making coke, steel, brick, etc..... | 307,060 | ..... | 7,742 | 104,077 | 10,271 | 485,271 | 914,421 |
| Used by producers for colliery consumption and by workmen..... | 723,067 | 2,000 | 9,201 | 243,370 | 883 | 218,686 | 1,197,207 |
| Total used..... | 1,030,127 | 2,000 | 16,943 | 347,447 | 11,154 | 703,957 | 2,111,628 |
| Production*..... | 7,980,073 | 70,311 | 212,897 | 4,014,755 | 19,722 | 2,714,420 | 15,012,178 |
| Stock on hand Jan. 1.... | 256,221 | ..... | ..... | 67,123 | 3,903 | 58,209 | 385,456 |
| Dec. 31.... | 352,308 | ..... | ..... | 127,456 | 4,623 | 16,090 | 500,477 |
| Difference..... | 96,087 | ..... | ..... | + 60,333 | + 720 | - 42,119 | + 115,021 |
| Losses due to breakage or other causes..... | 58,944 | ..... | 6,748 | 114,448 | 0 | 225,539 | 405,679 |
| Total output..... | 8,135,104 | ..... | 219,645 | 4,189,536 | 20,442 | 2,897,840 | 15,532,878 |

*Production is obtained by adding coal sold and coal used.

Distribution of Coal Mined During the Years 1909-10-11-12.

| | 1909. | 1910. | 1911. | 1912. |
|---|------------|------------|------------|------------|
| Sales in Canada..... | 7,468,880 | 8,956,450 | 8,559,952 | 10,572,365 |
| Sales for export to United States..... | 1,173,772 | 1,847,943 | 1,068,572 | 1,537,585 |
| " other countries..... | 171,388 | 291,273 | 280,235 | 314,410 |
| Total sales..... | 8,814,040 | 11,095,666 | 9,908,759 | 12,424,360 |
| Used by producers for the manufacture of coke..... | 752,976 | 759,703 | 452,354 | 870,885 |
| " colliery consumption and workmen..... | 934,459 | 1,053,783 | 962,275 | 1,217,564 |
| Production..... | 10,501,475 | 12,909,152 | 11,323,388 | 14,512,829 |
| Stock on hand Jan. 1..... | 202,432 | 200,019 | 265,046 | 314,742 |
| " Dec. 31..... | 219,569 | 263,666 | 307,755 | 282,069 |
| Difference..... | + 17,137 | + 63,647 | + 42,709 | - 32,673 |
| Loss due to washing, breakage, or other causes..... | 154,162 | 243,716 | 182,567 | 167,291 |
| Total output..... | 10,672,774 | 13,216,515 | 11,548,664 | 14,647,447 |

Statistics of the annual production of coal in Canada from 1785 to date are given in the following table. The total production has been 226,702,157 tons. Of this amount Nova Scotia has produced 145,297,509 tons, or 64.09 per cent; British Columbia 50,812,657 tons, or 22.41 per cent; Alberta 27,478,901 tons or 12.12 per cent; Saskatchewan 2,302,719 tons or 1.02 per cent; New Brunswick 696,102 tons or 0.31 per cent, and Yukon Territory 114,269 tons or 0.05 per cent. It should be noted though, that, in spite of the adverse conditions, the 1914 production is the third largest in Canada's history, having been exceeded by that of 1912 and 1913 only. The total production averaged 1.688 tons per capita of population—as compared with 1.936 tons per capita in 1913.

Annual Production of Coal Showing the Increase or Decrease Each Year.

| Year. | Tons. | Value. | Average value per ton. | Increase (i) or decrease (d) in tonnage. | Increase (i) or decrease (d) per cent. |
|-------------------|------------|------------|------------------------|--|--|
| | | \$ | \$ cts. | | |
| 1785 to 1873..... | *8,592,150 | | | | |
| 1874..... | 1,063,742 | 1,763,423 | 1 66 | | |
| 1875..... | 1,039,974 | 1,747,016 | 1 68 | (d) 23,768 | (d) 2.2 |
| 1876..... | 994,762 | 1,729,546 | 1 74 | (d) 45,212 | (d) 4.3 |
| 1877..... | 1,036,670 | 1,794,415 | 1 73 | (i) 41,908 | (i) 4.2 |
| 1878..... | 1,089,744 | 1,941,285 | 1 78 | (i) 53,074 | (i) 5.1 |
| 1879..... | 1,126,497 | 2,050,639 | 1 82 | (i) 36,753 | (i) 3.4 |
| 1880..... | 1,482,714 | 2,657,194 | 1 79 | (i) 356,217 | (i) 31.6 |
| 1881..... | 1,537,106 | 2,688,621 | 1 75 | (i) 54,392 | (i) 3.7 |
| 1882..... | 1,848,148 | 3,248,446 | 1 76 | (i) 311,042 | (i) 0.2 |
| 1883..... | 1,818,684 | 3,109,635 | 1 71 | (d) 29,464 | (d) 21.6 |
| 1884..... | 1,984,959 | 3,593,831 | 1 81 | (i) 166,275 | (i) 9.1 |
| 1885..... | 1,920,977 | 3,417,807 | 1 78 | (d) 63,982 | (d) 3.2 |
| 1886..... | 2,116,653 | 3,739,840 | 1 77 | (i) 195,676 | (i) 10.2 |
| 1887..... | 2,429,330 | 4,388,206 | 1 81 | (i) 312,677 | (i) 14.8 |
| 1888..... | 2,602,552 | 4,674,140 | 1 80 | (i) 173,222 | (i) 7.1 |
| 1889..... | 2,658,303 | 4,894,287 | 1 84 | (i) 55,751 | (i) 2.1 |
| 1890..... | 3,084,682 | 5,676,247 | 1 84 | (i) 426,379 | (i) 16.0 |
| 1891..... | 3,577,749 | 7,019,425 | 1 96 | (i) 493,067 | (i) 16.0 |
| 1892..... | 3,287,745 | 6,363,757 | 1 94 | (d) 290,004 | (d) 8.1 |
| 1893..... | 3,783,499 | 7,359,080 | 1 95 | (i) 495,754 | (i) 15.1 |
| 1894..... | 3,847,070 | 7,429,468 | 1 93 | (i) 63,571 | (i) 1.7 |
| 1895..... | 3,478,344 | 6,739,153 | 1 94 | (d) 368,726 | (d) 9.6 |
| 1896..... | 3,745,716 | 7,226,462 | 1 93 | (i) 267,372 | (i) 7.7 |
| 1897..... | 3,786,107 | 7,303,597 | 1 93 | (i) 40,391 | (i) 1.1 |
| 1898..... | 4,173,108 | 8,224,288 | 1 97 | (i) 387,001 | (i) 10.2 |
| 1899..... | 4,925,051 | 10,283,497 | 2 09 | (i) 751,943 | (i) 18.0 |
| 1900..... | 5,777,319 | 13,742,178 | 2 38 | (i) 852,268 | (i) 17.3 |
| 1901..... | 6,486,325 | 12,699,243 | 1 96 | (i) 709,006 | (i) 12.3 |
| 1902..... | 7,466,681 | 15,210,877 | 2 04 | (i) 780,356 | (i) 15.1 |
| 1903..... | 7,960,364 | 15,942,833 | 2 00 | (i) 493,683 | (i) 6.6 |
| 1904..... | 8,254,595 | 16,592,231 | 2 01 | (i) 294,231 | (i) 3.7 |
| 1905..... | 8,667,948 | 17,520,263 | 2 02 | (i) 413,353 | (i) 5.0 |
| 1906..... | 9,762,601 | 19,732,019 | 2 02 | (i) 1,094,653 | (i) 12.6 |
| 1907..... | 10,511,426 | 24,381,842 | 2 32 | (i) 748,825 | (i) 7.7 |
| 1908..... | 10,886,311 | 25,194,573 | 2 31 | (i) 374,885 | (i) 3.5 |
| 1909..... | 10,501,475 | 24,781,236 | 2 36 | (d) 384,836 | (d) 3.5 |
| 1910..... | 12,909,152 | 30,909,779 | 2 39 | (i) 2,407,677 | (i) 22.93 |
| 1911..... | 11,323,388 | 26,467,646 | 2 34 | (d) 1,585,764 | (d) 12.28 |
| 1912..... | 14,512,829 | 36,019,044 | 2 48 | (i) 3,189,441 | (i) 28.04 |
| 1913..... | 15,012,178 | 37,334,940 | 2 49 | (i) 499,349 | (i) 3.44 |
| 1914..... | 13,637,529 | 33,471,801 | 2 45 | (d) 1,374,649 | (d) 9.16 |

*The total production for the years 1785 to 1873 is made up as follows:—

Nova Scotia (1785 to 1873).....8,053,670 tons of 2,000 pounds.
 British Columbia (1836 to 1873)..... 538,480 " 2,000 "

Exports of Canadian Coal.

Statistics of the exports of coal, according to the records of the Department of Customs, are given in the following table. The exports of Canadian coal in 1914 were 1,423,126 tons, valued at \$3,880,175 or an average of \$2.73 per ton, as compared with exports in 1913 of 1,562,020 tons valued at \$3,961,351, or an average of \$2.54 per ton, and exports in 1912 of 2,127,133 tons valued at \$5,821,593 or an average of \$2.74 per ton. The 1914 exports, compared with those of 1913 show a decrease of 8.89 per cent in tonnage, and 2.04 per cent in value. Besides Canadian coal exported there is also a small export of "coal not the produce of Canada".

Annual Exports of Coal.

| Calendar Year. | Produce of Canada. | Not the produce of Canada. | Calendar Year. | Produce of Canada. | Not the produce of Canada. |
|----------------|--------------------|----------------------------|----------------|--------------------|----------------------------|
| | Tons. | Tons. | | Tons. | Tons. |
| 1873..... | 420,683 | 5,403 | 1894..... | 1,103,694 | 89,786 |
| 1874..... | 310,988 | 12,859 | 1895..... | 1,011,235 | 96,836 |
| 1875..... | 250,348 | 14,026 | 1896..... | 1,106,661 | 116,774 |
| 1876..... | 248,638 | 4,995 | 1897..... | 986,130 | 101,848 |
| 1877..... | 301,317 | 4,829 | 1898..... | 1,150,029 | 99,189 |
| 1878..... | 327,959 | 5,468 | 1899..... | 1,293,169 | 101,004 |
| 1879..... | 306,648 | 8,468 | 1900..... | 1,787,777 | 62,776 |
| 1880..... | 432,188 | 14,217 | 1901..... | 1,573,661 | 53,894 |
| 1881..... | 395,382 | 14,245 | 1902..... | 2,090,268 | 23,453 |
| 1882..... | 412,682 | 37,576 | 1903..... | 1,954,629 | 27,138 |
| 1883..... | 486,811 | 44,388 | 1904..... | 1,557,412 | 27,308 |
| 1884..... | 474,405 | 62,665 | 1905..... | 1,635,287 | 86,792 |
| 1885..... | 427,937 | 71,003 | 1906..... | 1,835,041 | 44,758 |
| 1886..... | 520,703 | 78,443 | 1907..... | 1,894,074 | 101,778 |
| 1887..... | 580,965 | 89,098 | 1908..... | 1,729,833 | 102,071 |
| 1888..... | 588,627 | 84,316 | 1909..... | 1,588,099 | 161,098 |
| 1889..... | 665,315 | 89,294 | 1910..... | 2,377,049 | 159,859 |
| 1890..... | 724,486 | 82,534 | 1911..... | 1,500,639 | 133,943 |
| 1891..... | 971,259 | 77,827 | 1912..... | 2,127,133 | 46,706 |
| 1892..... | 823,733 | 93,988 | 1913..... | 1,562,020 | 69,566 |
| 1893..... | 960,312 | 102,827 | 1914..... | 1,423,126 | 83,137 |

A table showing the destination of coal exported during recent years follows.

Exports of Coal Produced During 1912-13-14.

| Exported to | 1912. | | | 1913. | | | 1914. | | |
|----------------------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|
| | Tons. | Per cent. | Value. | Tons. | Per cent. | Value. | Tons. | Per cent. | Value. |
| | | | \$ | | | \$ | | | \$ |
| Great Britain..... | 59,302 | 2·8 | 202,151 | 12,098 | 0·8 | 39,103 | 25,576 | 1·8 | 86,674 |
| United States..... | 1,603,145 | 75·4 | 4,042,803 | 1,250,769 | 80·1 | 2,978,067 | 1,088,983 | 76·5 | 2,742,425 |
| Newfoundland..... | 167,519 | 7·9 | 482,194 | 220,147 | 14·1 | 653,346 | 174,921 | 12·2 | 523,728 |
| Other countries..... | 297,167 | 13·9 | 1,094,445 | 79,006 | 5·0 | 290,835 | 133,646 | 9·5 | 527,258 |
| Total..... | 2,127,133 | 100·0 | 5,821,593 | 1,562,020 | 100·0 | 3,961,351 | 1,423,126 | 100·0 | 3,880,175 |

These figures show a decrease of 12·9 per cent in exports to the United States, which, however, with an importation from Canada of 1,088,983 tons, took 76·5 per cent of Canada's exports. Exports to Newfoundland showed a decrease of 20·58 per cent. Those to Great Britain showed an increase of 111·4 per cent, the total for the year reaching 25,576 tons. Under exports to other countries of 133,646 tons is included 40,978 tons to Australia, as compared with 13,889 tons in 1913.

Imports of Coal.

The fact that the populous Provinces of Quebec and Ontario have no coal-fields and can secure most of their requirements more cheaply from the coal-fields of Pennsylvania, Ohio, and Virginia, than from Canadian coal-fields accounts for Canadian imports exceeding 50 per cent of Canada's annual coal consumption. The 1914 imports were 14,721,057 tons, a decrease from the 1913 imports of 3,480,896 tons.

Imports of coal into Canada are subdivided into three classes as follows: anthracite, including anthracite dust; bituminous, round and run of mine; and bituminous slack such as will pass through a $\frac{3}{4}$ -inch screen.

The imports of anthracite represent, practically, Canada's consumption of coal of this variety, as less than 200,000 tons is produced yearly by Canada's one anthracite coal mine at Bankhead, Alberta. The 1914 imports were 4,435,010 tons valued at \$21,241,924 an average of \$4.79 per ton, which is a decrease of 207,047 tons, or 4.46 per cent from the 1913 imports. In bituminous coal of all classes the imports were 10,286,047 tons valued at \$18,559,574, a decrease in quantity of 24.14 per cent. It may be noted here that the imports of bituminous coal of all classes (according to returns of the Customs Department) into Fort William and Port Arthur, and into the Provinces of Manitoba, Saskatchewan, Alberta, and British Columbia, for the fiscal years ending March 31, 1913, 1914, and 1915, were respectively 2,774,687 tons, 3,331,114 tons, and 1,854,559 tons. The imports for the last fiscal year for use west of Lake Superior are thus shown to be 44.32 per cent below those of the year previous, and are even 33.16 per cent below those of the fiscal year ending March 31, 1913.

The following table gives details of the imports of the different classes of coal into Canada from 1880 to 1914.

Annual Imports of Coal.

| Fiscal Year. | BITUMINOUS COAL. | | ANTHRACITE COAL AND ANTHRACITE DUST. | | BITUMINOUS COAL DUST. | |
|----------------|--|------------|--|------------|---|-----------|
| | Tons. | Value. | Tons. | Value. | Tons. | Value. |
| | | \$ | | \$ | | \$ |
| 1880..... | 457,049 | 1,220,761 | 516,729 | 1,509,960 | 3,565 | 8,877 |
| 1881..... | 587,024 | 1,741,568 | 572,092 | 2,325,937 | 337 | 666 |
| 1882..... | 636,374 | 1,992,081 | 638,273 | 2,666,356 | 471 | 900 |
| 1883..... | 911,629 | 2,996,198 | 754,891 | 3,344,936 | 8,154 | 10,082 |
| 1884..... | 1,118,615 | 3,613,470 | 868,000 | 3,831,283 | 12,782 | 14,600 |
| 1885..... | 1,011,875 | 3,197,539 | 910,324 | 3,909,844 | 20,185 | 20,412 |
| 1886..... | 930,949 | 2,591,554 | 995,425 | 4,028,050 | 36,230 | 36,996 |
| 1887..... | 1,149,792 | 3,126,225 | 1,100,165 | 4,423,062 | 31,401 | 33,178 |
| 1888..... | 1,231,234 | 3,451,661 | †2,138,627 | 5,291,875 | 28,808 | 34,730 |
| 1889..... | 1,248,540 | 3,255,171 | 1,291,705 | 5,199,481 | 39,980 | 47,139 |
| 1890..... | 1,409,282 | 3,528,959 | 1,201,335 | 4,595,727 | 53,104 | 29,818 |
| 1891..... | 1,598,855 | 4,060,896 | 1,399,067 | 5,224,452 | 60,127 | 36,130 |
| 1892..... | 1,615,220 | 4,099,221 | 1,479,106 | 5,640,346 | 82,091 | 39,840 |
| 1893..... | 1,603,154 | 3,967,764 | 1,500,550 | 6,355,285 | 109,585 | 44,474 |
| 1894..... | 1,359,509 | 3,315,094 | 1,530,522 | 6,354,040 | 117,573 | 49,510 |
| 1895..... | 1,444,928 | 3,321,387 | 1,404,342 | 5,350,627 | 181,318 | 52,221 |
| 1896..... | 1,538,489 | 3,299,025 | 1,574,355 | 5,667,096 | 210,386 | 53,742 |
| 1897..... | 1,543,476 | 3,254,217 | 1,457,295 | 5,695,168 | 225,562 | 59,609 |
| 1898..... | 1,684,024 | 3,179,595 | 1,460,701 | 5,874,685 | 229,445 | 45,556 |
| 1899..... | 2,171,358 | 3,691,946 | 1,745,460 | 6,490,509 | 276,547 | 44,717 |
| 1900..... | 2,439,764 | 4,310,964 | 1,654,401 | 6,602,912 | 330,174 | 98,349 |
| 1901..... | 2,516,392 | 4,956,025 | 1,933,283 | 7,923,950 | 414,432 | 275,559 |
| 1902..... | 3,047,392 | 5,712,058 | 1,652,451 | 7,021,939 | 489,548 | 264,550 |
| 1903..... | 3,511,412 | 7,776,717 | 1,456,713 | 7,028,664 | 550,883 | 420,317 |
| 1904..... | 4,053,900 | 9,108,208 | 2,275,018 | 10,461,223 | 608,041 | 544,128 |
| 1905..... | 4,176,274 | 8,002,896 | 2,604,137 | 12,093,371 | 650,261 | 343,456 |
| 1906..... | 4,495,550 | 8,360,348 | 2,200,863 | 10,304,308 | 747,251 | 489,180 |
| Calendar Year. | Bituminous round and run of the mine. | | | | Bituminous slack such as will pass through a ½" screen. | |
| 1907..... | 6,370,152 | 13,232,445 | 3,141,873 | 14,506,129 | 1,139,256 | 1,121,949 |
| 1908..... | 6,025,574 | 12,516,748 | 3,160,110 | 14,478,536 | 1,111,811 | 1,355,677 |
| 1909..... | 5,625,063 | 11,455,818 | 3,017,844 | 13,906,152 | 1,230,017 | 1,469,889 |
| 1910..... | 5,966,466 | 11,919,341 | 3,266,235 | 14,735,062 | 1,365,281 | 1,795,598 |
| 1911..... | 8,905,815 | 18,407,603 | 4,020,577 | 18,794,192 | 1,632,500 | 2,090,796 |
| 1912..... | 8,491,840 | 16,846,727 | 4,184,017 | 20,080,388 | 1,919,953 | 2,550,922 |
| 1913..... | a 10,743,473 | 21,756,658 | (b) 4,642,057 | 22,034,839 | (c) 2,816,423 | 4,157,622 |
| 1914..... | a 7,776,415 | 14,954,321 | (b) 4,435,010 | 21,241,924 | (c) 2,509,632 | 3,605,253 |

(a). Duty, 53 cents per ton. (b). Coal, anthracite, and anthracite coal dust; duty free. (c). Duty 14 cents per ton.

† In the anthracite column the imports show a very considerable increase in 1888 over 1887, an increase of over 94 per cent, the falling off again in 1889 being quite as remarkable. The average values per ton for the three years 1887, 1888, and 1889, were \$4.02, \$2.47, and \$4.03, respectively. Although a duty of 50 cents per ton on anthracite coal was removed May 13, 1887, it is hardly thought this would account for the changes indicated, and unless some error may possibly have crept into the Trade and Navigation report, no explanation is available.

Consumption of Coal.

The consumption of coal during 1914 was 26,852,323 tons, a decrease of 4,730,222 tons, or 14·98 per cent from the 1913 figures, and was almost the same as the 1912 consumption which was 26,934,800 tons. On an estimated population of 8,075,000 people, the per capita consumption during 1914 was 3·325 tons, as compared with 4·071 tons in 1913, and 3·596 tons in 1912.

Consumption of Coal 1913-1914.

| | 1913. | | 1914. | |
|--|------------|------------|------------|------------|
| | Tons. | Tons. | Tons. | Tons. |
| Production | 15,012,178 | ..... | 13,637,529 | ..... |
| Exports of Canada | 1,562,020 | ..... | 1,423,126 | ..... |
| Home consumption of Canadian coal..... | ..... | 13,450,158 | ..... | 12,214,403 |
| Imports | 18,201,953 | ..... | 14,721,057 | ..... |
| Exports not produce of Canada..... | 69,566 | ..... | 83,137 | ..... |
| Canadian consumption of imported coal..... | ..... | 18,132,387 | ..... | 14,637,920 |
| Total consumption of coal in Canada..... | ..... | 31,582,545 | ..... | 26,852,323 |

Annual Consumption of Coal.

| Calendar Year. | Can- adian. | Im- ported. | Total. | Per- centage Can- adian. | Per- centage im- ported. | Con- sumption per capita. |
|----------------|----------------|----------------|------------|-----------------------------------|-----------------------------------|------------------------------------|
| | Tons. | Tons. | Tons. | % | % | Tons. |
| 1886..... | 1,595,950 | 1,884,161 | 3,480,111 | 45.9 | 54.1 | 0.758 |
| 1887..... | 1,848,365 | 2,192,260 | 4,040,625 | 45.7 | 54.3 | 0.871 |
| 1888..... | 2,013,925 | 3,314,353 | 5,328,278 | 37.8 | 62.2 | 1.137 |
| 1889..... | 1,992,988 | 2,490,931 | 4,483,919 | 44.4 | 55.6 | 0.946 |
| 1890..... | 1,360,196 | 2,581,187 | 4,941,383 | 47.8 | 52.2 | 1.031 |
| 1891..... | 2,606,490 | 2,980,222 | 5,586,712 | 46.7 | 53.3 | 1.153 |
| 1892..... | 2,464,012 | 3,082,429 | 5,546,441 | 44.4 | 55.6 | 1.133 |
| 1893..... | 2,823,187 | 3,110,462 | 5,933,649 | 47.6 | 52.4 | 1.198 |
| 1894..... | 2,743,376 | 2,917,818 | 5,661,194 | 48.5 | 51.5 | 1.130 |
| 1895..... | 2,467,109 | 2,933,752 | 5,400,861 | 45.7 | 54.3 | 1.066 |
| 1896..... | 2,639,055 | 3,206,456 | 5,845,511 | 45.1 | 54.9 | 1.140 |
| 1897..... | 2,799,977 | 3,124,485 | 5,924,462 | 47.3 | 52.7 | 1.143 |
| 1898..... | 3,023,079 | 3,274,981 | 6,298,060 | 48.0 | 52.0 | 1.200 |
| 1899..... | 3,631,882 | 4,092,361 | 7,724,243 | 47.0 | 53.0 | 1.454 |
| 1900..... | 3,989,542 | 4,361,563 | 8,351,105 | 47.8 | 52.2 | 1.561 |
| 1901..... | 4,912,664 | 4,810,213 | 9,722,877 | 50.5 | 49.5 | 1.810 |
| 1902..... | 5,376,413 | 5,165,938 | 10,542,351 | 51.0 | 49.0 | 1.927 |
| 1903..... | 6,005,735 | 5,491,870 | 11,507,605 | 52.2 | 47.8 | 2.055 |
| 1904..... | 6,697,183 | 6,909,651 | 13,606,834 | 49.2 | 50.8 | 2.346 |
| 1905..... | 7,032,661 | 7,343,880 | 14,376,541 | 48.9 | 51.1 | 2.362 |
| 1906..... | 7,927,560 | 7,398,906 | 15,326,466 | 51.7 | 48.3 | 2.425 |
| 1907..... | 8,617,352 | 10,549,503 | 19,166,855 | 45.0 | 55.0 | 2.947 |
| 1908..... | 9,156,478 | 10,195,424 | 19,351,902 | 47.3 | 52.7 | 2.820 |
| 1909..... | 8,913,376 | 9,711,826 | 18,625,202 | 47.9 | 52.1 | 2.682 |
| 1910..... | 10,532,103 | 10,438,123 | 20,970,226 | 50.2 | 49.8 | 2.960 |
| 1911..... | 9,822,749 | 14,424,949 | 24,247,698 | 40.5 | 59.5 | 3.384 |
| 1912..... | 12,385,696 | 14,549,104 | 26,934,800 | 46.0 | 54.0 | 3.596 |
| 1913..... | 13,450,158 | 18,132,387 | 31,582,545 | 42.6 | 57.4 | 4.071 |
| 1914..... | 12,214,403 | 14,637,920 | 26,852,323 | 45.5 | 54.5 | 3.325 |

Nova Scotia.

During 1914, twelve operating companies in Nova Scotia produced 7,370,924 tons, as compared with eleven companies operating in 1913, which produced 7,980,073 tons. The decrease in tonnage is 7.63 per cent.

The Dominion Coal Company continued as the largest operator, producing 5,250,748 tons, which is 71.23 per cent of the Province's production, and 38.5 per cent of the Canadian production.

The coal produced by Nova Scotia in 1914 was disposed of as follows: 5,851,735 tons was sold for consumption in Canada; 399,533 tons for export to the United States; 239,927 tons for export to other countries; 733,814 tons was used for colliery consumption, and by workmen; and 145,915 tons was used by colliery operators in making coke and in steel making; and a small quantity, not reported, was used in making briquettes. The quantity in stock at the close of the year was 93,066 tons less than at January 1. The sales show decreases ranging from 4 per cent to 9 per cent as compared with the 1913 sales.

The tonnage of coal absorbed in the manufacture of coke showed a remarkable decrease falling from 1,109,629 tons in 1913 to 595,868 tons in 1914¹ this decrease being due to the stagnation in the iron and steel industry.

Cape Breton maintained its position as the premier coal-producing county with 77.44 per cent of coal raised in the Province. Cumberland county raised 9.4 per cent, Pictou county 9.2 per cent, and other counties 4 per cent.

Tables giving statistics regarding the coal trade for the calendar year follow:—

¹ See tables of Coke Production.

Coal Production by Companies in Nova Scotia, 1914, in Short Tons.

| | Total sales. | Used. | | Production. ² | Stocks. | | Losses. ³ | Output. |
|---|--------------|------------------------|----------------------|--------------------------|---------|----------|----------------------|-----------|
| | | For coke. ¹ | Colliery consumption | | Jan. 1. | Dec. 31. | | |
| Inverness Ry. and Coal Co..... | 225,807 | 742 | 31,216 | 265,139 | 1,942 | 2,604 | 30,823 | 296,624 |
| Sydney Coal Co., Ltd..... | 7,840 | | 280 | 8,400 | 48 | | | 8,352 |
| Dominion Coal Co., Ltd..... | 4,412,463 | | 314,939 | 4,789,044 | 206,289 | 89,971 | 129,518 | 4,802,244 |
| Cape Breton Coal, Iron and Ry. Co..... | 37,119 | | 8,548 | 46,322 | 2,174 | 9,914 | | 54,062 |
| Nova Scotia Steel and Coal Co., Ltd..... | 615,041 | 139,625 | 58,543 | 837,511 | 15,120 | 10,892 | 9,128 | 842,411 |
| The Colonial Coal Co., Ltd..... | 54,645 | | 4,914 | 60,266 | 486 | 382 | 335 | 60,497 |
| Acadia Coal Co., Ltd..... | 382,879 | | 46,596 | 442,189 | 2,000 | 1,536 | | 441,725 |
| Intercolonial Coal Mining Co..... | 182,636 | 5,548 | 31,397 | 228,194 | 785 | 11,842 | 380 | 239,631 |
| Maritime Coal Ry. and Power Co..... | 126,377 | | 26,788 | 156,514 | | 2,856 | | 159,370 |
| Dominion Coal Co., Ltd. (Springhill)..... | 382,029 | | 67,030 | 461,704 | 2,974 | 8,777 | | 467,507 |
| Minudie Coal Co., Ltd..... | 61,965 | | 8,644 | 72,976 | | | | 72,976 |
| Atlantic Grindstone Coal and Ry. Co..... | 714 | | 45 | 817 | 22 | | | 795 |
| Royal Coal Co., Ltd..... | 1,680 | | 112 | 1,848 | | | | 1,848 |
| | 6,491,195 | 145,915 | 599,052 | 7,370,924 | 231,840 | 138,774 | 170,184 | 7,448,042 |

¹Includes also coal used by producers for steel making and other purposes.

²Production is obtained by adding sales and coal used.

³Complete records of losses are not furnished by all producers.

Coal Production by Companies in Nova Scotia, 1913, in Short Tons.

| | Total Sales. | Used. | | | Production. ² | Stocks. | | Losses. | Output. |
|---|--------------|------------------------|-----------------------|----------|--------------------------|---------|----------|---------|-----------|
| | | For Coke. ¹ | Colliery consumption. | Workmen. | | Jan. 1. | Dec. 31. | | |
| Inverness Ry. and Coal Co..... | 291,086 | 7,421 | 21,631 | 7,475 | 327,613 | 478 | 1,942 | 31 | 329,108 |
| Sydney Coal Co., Ltd..... | 5,950 | ..... | 50 | 50 | 6,050 | 10 | 30 | ..... | 6,070 |
| Dominion Coal Co., Ltd..... | 4,773,766 | ..... | 333,990 | 59,790 | 5,167,546 | 239,579 | 326,919 | 52,961 | 5,307,847 |
| Nova Scotia Steel and Coal Co., Ltd..... | 572,835 | 282,176 | 30,733 | 19,277 | 905,021 | 8,960 | 15,120 | 1,481 | 912,662 |
| The Colonial Coal Co., Ltd..... | 71,943 | ..... | 4,863 | 1,207 | 78,013 | 1,238 | 486 | ..... | 77,261 |
| Acadia Coal Co., Ltd..... | 3,325 | ..... | 3,680 | 401 | 7,406 | ..... | 2,029 | ..... | 9,435 |
| Intercolonial Coal Mining Co..... | 521,717 | ..... | 69,461 | 13,677 | 604,855 | 3,040 | 2,000 | ..... | 603,815 |
| Cumberland Ry. and Coal Co..... | 155,479 | 17,463 | 33,385 | 7,034 | 213,361 | 784 | 785 | ..... | 213,362 |
| Maritime Coal, Ry., and Power Co..... | 145,880 | ..... | 22,881 | 3,115 | 171,876 | ..... | ..... | ..... | 171,876 |
| Minutiae Coal Co., Ltd..... | 347,039 | ..... | 67,451 | 11,873 | 426,363 | ..... | 2,975 | ..... | 427,206 |
| Atlantic Grindstone, Coal and Ry. Co..... | 58,099 | ..... | 8,983 | 1,865 | 68,947 | ..... | ..... | 4,471 | 73,418 |
| Riverside Mine (Eastern Coal Co., Ltd.).. | 2,827 | ..... | 110 | 85 | 3,022 | ..... | 22 | ..... | 3,044 |
| | 6,949,946 | 307,060 | 597,218 | 125,849 | 7,980,073 | 256,221 | 352,308 | 58,944 | 8,135,104 |

¹ Includes also coal used by producers for steel making and other purposes.

² Production is obtained by adding sales and coal used.

³ Complete records of losses are not furnished by all producers.

Output, Sales, Colliery Consumption, and Production of Coal in Nova Scotia.

| Calendar Year. | Output, tons, 2,240 lbs. | Sold or used, tons, 2,240 lbs. | Colliery consump- tion, tons, 2,240 lbs. | Production,* tons, 2,240 lbs. | Output, tons, 2,000 lbs. | Sold or used, tons, 2,000 lbs. | Colliery consump- tion, tons, 2,000 lbs. | Production,* tons, 2,000 lbs. | Price per ton, 2,240 lbs. | Value of production. \$ |
|----------------|--------------------------------|--------------------------------------|---|-------------------------------------|--------------------------------|--------------------------------------|---|-------------------------------------|---------------------------------|----------------------------------|
| 1872..... | 880,950 | 785,914 | 110,341 | 896,255 | 986,664 | 880,224 | 123,582 | 1,003,806 | 1 75 | 1,568,446 |
| 1873..... | 1,051,467 | 881,106 | 108,398 | 989,504 | 1,177,643 | 986,839 | 131,406 | 1,108,245 | 1 75 | 1,731,632 |
| 1874..... | 872,720 | 749,127 | 108,398 | 868,709 | 977,446 | 839,022 | 123,932 | 1,072,954 | 1 75 | 1,520,240 |
| 1875..... | 781,165 | 706,795 | 124,110 | 830,905 | 874,905 | 791,610 | 139,003 | 930,613 | 1 75 | 1,454,084 |
| 1876..... | 709,646 | 634,207 | 113,788 | 747,995 | 874,905 | 710,312 | 127,443 | 837,755 | 1 75 | 1,308,991 |
| 1877..... | 757,496 | 687,065 | 98,841 | 785,906 | 848,396 | 769,513 | 110,702 | 880,215 | 1 75 | 1,375,339 |
| 1878..... | 770,603 | 693,511 | 88,627 | 782,138 | 863,075 | 776,732 | 99,262 | 875,994 | 1 75 | 1,368,741 |
| 1879..... | 788,271 | 688,624 | 84,787 | 773,411 | 882,863 | 771,259 | 94,961 | 866,220 | 1 75 | 1,353,469 |
| 1880..... | 1,032,710 | 954,659 | 96,831 | 1,051,490 | 1,156,635 | 1,069,218 | 108,451 | 1,177,669 | 1 75 | 1,840,108 |
| 1881..... | 1,124,270 | 1,035,014 | 107,888 | 1,142,902 | 1,259,183 | 1,159,216 | 120,834 | 1,280,050 | 1 75 | 2,000,079 |
| 1882..... | 1,365,811 | 1,250,179 | 111,949 | 1,361,560 | 1,529,708 | 1,400,200 | 124,747 | 1,524,947 | 1 75 | 2,382,730 |
| 1883..... | 1,422,553 | 1,297,523 | 111,949 | 1,409,472 | 1,503,259 | 1,453,226 | 125,383 | 1,578,609 | 1 75 | 2,466,576 |
| 1884..... | 1,389,295 | 1,261,650 | 116,769 | 1,378,419 | 1,556,011 | 1,413,048 | 130,781 | 1,543,829 | 1 75 | 2,412,233 |
| 1885..... | 1,352,205 | 1,254,510 | 127,624 | 1,382,134 | 1,514,470 | 1,405,051 | 142,939 | 1,547,990 | 1 75 | 2,418,735 |
| 1886..... | 1,502,611 | 1,373,666 | 142,421 | 1,516,087 | 1,682,924 | 1,538,506 | 159,512 | 1,698,018 | 1 75 | 2,653,132 |
| 1887..... | 1,670,830 | 1,519,684 | 139,777 | 1,659,461 | 1,871,330 | 1,702,046 | 176,336 | 1,858,596 | 1 75 | 2,904,037 |
| 1888..... | 1,776,128 | 1,576,692 | 157,443 | 1,734,135 | 1,989,263 | 1,765,895 | 177,107 | 1,942,331 | 1 75 | 3,034,735 |
| 1889..... | 1,756,279 | 1,555,107 | 157,443 | 1,734,135 | 1,967,032 | 1,741,720 | 177,107 | 1,918,827 | 1 75 | 3,098,167 |
| 1890..... | 1,984,001 | 1,786,111 | 161,240 | 1,947,351 | 2,222,081 | 2,000,444 | 180,589 | 2,181,033 | 1 75 | 3,407,864 |
| 1891..... | 2,044,784 | 1,849,945 | 174,983 | 2,024,928 | 2,290,158 | 2,071,938 | 195,981 | 2,267,919 | 1 75 | 3,543,624 |
| 1892..... | 1,752,934 | 1,572,934 | 175,025 | 1,928,068 | 2,175,913 | 1,963,286 | 196,103 | 2,159,389 | 1 75 | 3,374,046 |
| 1893..... | 2,223,042 | 1,977,543 | 205,426 | 2,182,968 | 2,520,707 | 2,308,231 | 230,076 | 2,444,924 | 1 75 | 3,820,194 |
| 1894..... | 2,250,631 | 2,060,920 | 196,206 | 2,257,126 | 2,520,707 | 2,308,231 | 219,751 | 2,527,982 | 1 75 | 3,949,970 |
| 1895..... | 1,999,756 | 1,793,098 | 193,639 | 1,986,737 | 2,489,807 | 2,248,848 | 230,076 | 2,508,579 | 1 75 | 3,476,700 |
| 1896..... | 2,292,675 | 2,046,828 | 192,975 | 2,239,808 | 2,537,706 | 2,308,231 | 216,875 | 2,527,982 | 1 75 | 3,919,355 |
| 1897..... | 2,340,031 | 2,044,672 | 181,716 | 2,226,388 | 2,537,706 | 2,308,231 | 216,875 | 2,527,982 | 1 75 | 3,919,355 |
| 1898..... | 2,262,656 | 2,121,126 | 187,428 | 2,288,554 | 2,584,175 | 2,375,661 | 187,519 | 2,493,554 | 1 75 | 3,806,170 |
| 1899..... | 2,865,443 | 2,633,989 | 177,460 | 2,811,449 | 3,209,296 | 2,950,067 | 138,775 | 3,163,180 | 1 75 | 4,004,970 |
| 1900..... | 3,298,791 | 2,998,737 | 236,563 | 3,235,300 | 3,694,646 | 3,358,585 | 264,051 | 3,623,536 | 2 00 | 5,622,808 |
| 1901..... | 3,821,033 | 3,411,127 | 301,434 | 3,712,561 | 4,279,557 | 3,820,462 | 337,606 | 4,158,068 | 2 50 | 6,088,250 |
| 1902..... | 4,725,480 | 4,229,120 | 379,198 | 4,608,318 | 5,292,538 | 4,736,614 | 424,702 | 5,161,316 | 1 75 | 6,496,982 |
| 1903..... | 5,215,562 | 4,565,720 | 481,903 | 5,047,623 | 5,841,429 | 5,113,607 | 539,731 | 5,653,338 | 2 00 | 10,095,246 |
| 1904..... | 5,131,985 | 4,551,740 | 144,904 | 4,996,644 | 5,747,823 | 5,097,949 | 498,292 | 5,596,241 | 2 00 | 9,993,288 |

Output, Sales, Colliery Consumption, and Production of Coal in Nova Scotia.

| Calendar Year. | Output tons, 2,240 lbs. | Sold or used, tons, 2,240 lbs. | Colliery consump- tion, tons, 2,240 lbs. | Production,* tons, 2,240 lbs. | Output, tons, 2,000 lbs. | Sold or used, tons, 2,000 lbs. | Colliery consump- tion, tons, 2,000 lbs. | Production*, tons, 2,000 lbs. | Price per ton, 2,240 lbs. | Value of production. \$ |
|----------------|-------------------------------|--------------------------------------|---|-------------------------------------|--------------------------------|--------------------------------------|---|-------------------------------------|---------------------------------|----------------------------------|
| 1905..... | 5,197,877 | 4,613,818 | 427,774 | 5,041,592 | 5,821,622 | 5,167,476 | 479,107 | 5,646,583 | 2 00 | 10,083,184 |
| 1906..... | 5,844,813 | 5,093,131 | 460,891 | 5,554,022 | 6,546,191 | 5,704,307 | 516,198 | 6,220,505 | 2 00 | 11,108,044 |
| 1907..... | 5,775,503 | 5,236,077 | 437,256 | 5,673,333 | 6,468,563 | 5,864,406 | 489,727 | 6,354,133 | 2 25 | 12,764,999 |
| 1908..... | 6,076,330 | 5,224,787 | 576,509 | 5,939,767 | 6,805,489 | 5,851,761 | 645,690 | 6,652,539 | 2 25 | 13,364,476 |
| 1909..... | 5,106,135 | 4,524,029 | 522,479 | 5,046,508 | 5,718,871 | 5,066,912 | 585,177 | 5,652,089 | 2 25 | 11,354,643 |
| 1910..... | 5,817,109 | 5,199,715 | 542,376 | 5,742,091 | 6,515,162 | 5,823,681 | 607,461 | 6,431,142 | 2 25 | 12,919,705 |
| 1911..... | 6,362,099 | 5,676,857 | 577,089 | 6,253,946 | 7,125,551 | 6,358,080 | 646,340 | 7,004,420 | 2 25 | 14,071,379 |
| 1912..... | 6,995,289 | 6,296,940 | 652,960 | 6,949,900 | 7,834,724 | 7,032,573 | 731,315 | 7,783,888 | 2 50 | 17,374,750 |
| 1913..... | 7,263,485 | 6,479,469 | 645,596 | 7,125,065 | 8,135,104 | 7,032,006 | 723,067 | 7,980,073 | 2 50 | 17,812,663 |
| 1914..... | 6,650,038 | 5,925,991 | 655,191 | 6,581,182 | 7,448,042 | 6,637,110 | 733,814 | 7,370,924 | 2 50 | 16,452,955 |

*This production is obtained by adding sales and colliery consumption.

Coal Trade by Counties in Nova Scotia, in Short Tons, Calendar Years Since 1906.

| Calendar Year. | CUMBERLAND. | | PICTOU. | | CAPE BRETON. | | OTHER COUNTIES. | | TOTAL. | |
|----------------|-------------|---------|---------|---------|--------------|-----------|-----------------|---------|-----------|-----------|
| | Raised. | Sales. | Raised. | Sales. | Raised. | Sales. | Raised. | Sales. | Raised. | Sales. |
| | | | | | | | | | | |
| 1906..... | 659,734 | 566,308 | 769,496 | 657,310 | 4,804,407 | 4,221,293 | 312,554 | 259,306 | 6,546,191 | 5,704,307 |
| 1907..... | 534,047 | 445,288 | 840,533 | 729,043 | 4,698,147 | 4,346,180 | 395,836 | 343,805 | 6,468,563 | 5,864,406 |
| 1908..... | 662,157 | 530,648 | 849,802 | 678,025 | 4,840,653 | 4,267,346 | 452,877 | 375,742 | 6,808,389 | 5,851,071 |
| 1909..... | 494,919 | 403,371 | 743,860 | 599,743 | 4,081,333 | 3,723,135 | 398,759 | 340,643 | 5,718,871 | 5,080,871 |
| 1910..... | 350,363 | 288,706 | 714,846 | 588,678 | 5,035,800 | 4,571,347 | 414,153 | 374,909 | 7,518,162 | 5,823,681 |
| 1911..... | 538,296 | 436,125 | 833,956 | 691,852 | 5,405,355 | 4,917,902 | 347,944 | 312,201 | 7,125,551 | 6,353,881 |
| 1912..... | 716,914 | 595,138 | 765,678 | 641,890 | 6,039,296 | 5,530,765 | 312,836 | 284,790 | 7,834,721 | 7,052,573 |
| 1913..... | 675,544 | 553,845 | 817,177 | 694,659 | 6,313,275 | 5,709,995 | 326,108 | 298,507 | 8,135,104 | 7,257,006 |
| 1914..... | 702,496 | 572,765 | 681,356 | 571,063 | 5,767,566 | 5,266,733 | 296,624 | 226,549 | 7,448,042 | 6,637,110 |

Sales include coal used for making coke and steel.

Production and Sales of Coal by Companies, in Nova Scotia, Year Ending September 30, 1914, in Short Tons.

| Name of company. | Output. Tons. | Sales. Tons. | Colliery consump- tion. Tons. | Supplied workmen. Tons. | On bank at close of year. Tons. | Difference on bank compared with 1913. | |
|--------------------------------------|------------------|-----------------|--|-------------------------------|--|---|-----------|
| | | | | | | Increase. | Decrease. |
| Dominion Coal Co. Ltd. | 5,097,589 | 4,562,867 | 325,917 | 60,918 | 98,297 | 19,193 | ..... |
| Nova Scotia Steel & Coal Co., Ltd. | 890,702 | 797,017 | 54,116 | 26,217 | 44,395 | 12,912 | ..... |
| Cumberland Railway & Coal Co., Ltd. | 448,824 | 361,769 | 67,409 | 11,869 | 10,340 | 7,777 | ..... |
| Acadia Coal Co. | 511,379 | 443,240 | 53,716 | 13,079 | 3,137 | 1,233 | ..... |
| Maritime Coal Railway & Power Co. | 160,376 | 442,979 | 13,230 | 3,180 | 1,288 | 1,288 | ..... |
| Inverness Railway & Coal Co. | 308,134 | 248,739 | 31,821 | 7,381 | 3,048 | 1,720 | ..... |
| Intercolonial Coal Co. | 247,825 | 200,483 | 29,424 | 8,090 | 10,300 | 9,444 | ..... |
| Sydney Coal Co. | 5,825 | 5,843 | 149 | 177 | 22 | ..... | 44 |
| Colonial Mining Co. | 68,587 | 56,872 | 5,661 | 1,054 | ..... | ..... | ..... |
| Minutale Coal Co. | 69,582 | 55,947 | 9,317 | 2,130 | 1,176 | 1,176 | ..... |
| Atlantic Grindstone & Coal Co. | ..... | 883 | 57 | 78 | ..... | ..... | 56 |
| Cape Breton Coal, Iron & Railway Co. | 42,269 | 28,623 | 8,207 | 492 | 6,387 | 4,947 | ..... |
| Total. | 7,846,120 | 6,904,352 | 599,024 | 134,665 | 178,590 | 59,690 | 100 |

The statistics prepared and published by the Provincial Department of Mines cover the fiscal years ending September 30; the long ton of 2,240 pounds is used exclusively in these reports. A number of tables appearing in the Provincial report for the fiscal year 1914 are reproduced below, the figures having been changed to show tons of 2,000 pounds.

The table of "Distribution of Coal Sold" shows the consumption by Nova Scotia of coal produced within the Province in 1914 to have been only 35.74 per cent of the total production, as compared with 40.12 per cent the year previous. The tonnage shipped to the Province of Quebec during the same period increased from 33.85 per cent of the Province's production in 1913 to 38.63 per cent in 1914.

Output of Coal in Nova Scotia by Collieries, During Fiscal Years
Ending September 30, 1912-13-14.

| Colliery. | 1912. Tons. of 2,000 lbs. | 1913. Tons of 2,000 lbs. | 1914. Tons of 2,000 lbs. |
|---|---------------------------------|--------------------------------|--------------------------------|
| <i>Cape Breton County.</i> | | | |
| Dominion Coal Company..... | 4,852,198 | 5,285,968 | 5,097,589 |
| Nova Scotia Steel and Coal Co..... | 919,705 | 908,806 | 890,262 |
| North Atlantic Collieries..... | 4,819 | | |
| Cape Breton Coal, Iron and Railway Co..... | | | 42,269 |
| Sydney Coal Company..... | 5,143 | 6,089 | 5,825 |
| Colonial Mining Co..... | 39,448 | 64,632 | 63,587 |
| <i>Cumberland County.</i> | | | |
| Cumberland Railway and Coal Co..... | 470,939 | 438,964 | 448,824 |
| Maritime Coal, Railway, and Power Co., Chignecto..... | 169,465 | 183,558 | 160,376 |
| Minudie Coal Co..... | 68,179 | 70,926 | 69,582 |
| Atlantic Grindstone and Coal Co..... | 163 | 3,040 | 962 |
| <i>Pictou County.</i> | | | |
| Acadia Coal Co..... | 492,213 | 570,501 | 511,269 |
| Intercolonial Coal Co..... | 272,616 | 217,512 | 247,441 |
| <i>Inverness County.</i> | | | |
| Inverness Coal and Railway Co..... | 324,469 | 318,387 | 308,134 |

Distribution of Coal Sold by Nova Scotia Producers.

| FISCAL YEARS ENDING SEPTEMBER 30. | | | | | | | | | | |
|--|-----------------------|---------------|-----------------------|----------------------|-----------------------|----------------------|-----------------------|----------------------|-----------------------|----------------------|
| Markets. | 1910. | | 1911. | | 1912. | | 1913. | | 1914. | |
| | Tons of 2,000 lbs. | Per cent. | Tons of 2,000 lbs. | Per cent. | Tons of 2,000 lbs. | Per cent. | Tons of 2,000 lbs. | Per cent. | Tons of 2,000 lbs. | Per cent. |
| Nova Scotia— Transported by land..... “ “ “ “ sea..... | 1,681,052 342,787 | 30.65 6.25 | 2,007,192 354,514 | 32.25 5.70 | 2,197,213 373,594 | 31.76 5.40 | 2,530,566 380,363 | 34.88 5.24 | 2,099,186 368,551 | 30.40 5.34 |
| Total Nova Scotia..... | 2,023,839 | 36.90 | 2,361,706 | 37.95 | 2,570,807 | 37.16 | 2,910,929 | 40.12 | 2,467,737 | 35.74 |
| New Brunswick..... | 594,288 | 10.84 | 606,582 | 9.74 | 732,411 | 10.59 | 724,239 | 9.98 | 762,150 | 11.04 |
| Prince Edward Island..... | 89,031 | 1.62 | 90,314 | 1.45 | 103,378 | 1.49 | 107,612 | 1.48 | 107,275 | 1.55 |
| Quebec Province..... | 2,001,382 | 39.49 | 2,315,971 | 37.22 | 2,418,086 | 34.95 | 2,456,416 | 33.85 | 2,667,372 | 38.63 |
| Newfoundland..... | 19,224 | 3.62 | 206,299 | 3.32 | 224,712 | 3.25 | 235,810 | 3.25 | 252,660 | 3.66 |
| United States..... | 325,548 | 5.93 | 372,177 | 5.98 | 462,035 | 6.68 | 524,262 | 7.23 | 336,741 | 4.88 |
| St. Pierre..... | 8,405 | 0.15 | 10,107 | 0.16 | 10,535 | 0.15 | 7,449 | 0.10 | 9,673 | 0.14 |
| Bunker coal..... | 243,807 | 4.45 | 229,243 | 3.68 | 265,142 | 3.83 | 262,278 | 3.62 | 278,645 | 4.04 |
| Other countries..... | ..... | ..... | (a) 30,841 | 0.50 | (b) 131,816 | 1.90 | (c) 27,160 | 0.37 | (d) 22,099 | 0.32 |
| Total..... | 5,484,524 | 100.00 | 6,223,240 | 100.00 | 6,918,929 | 100.00 | 7,256,155 | 100.00 | 6,904,352 | 100.00 |
| For time chartered boats..... | ..... | ..... | (a) Tons. 28,610 | Per cent. 0.46 | (b) Tons. 28,972 | Per cent. 0.42 | (c) Tons. 23,958 | Per cent. 0.33 | (d) Tons. 20,787 | Per cent. 0.30 |
| Other countries..... | ..... | ..... | 2,231 | 0.04 | 102,844 | 1.48 | 3,202 | 0.04 | 1,312 | 0.02 |
| | 30,841 | 0.50 | 131,816 | 1.90 | 27,160 | 0.37 | 22,099 | 0.32 | | |

Number and Classes of Workmen Employed at Each Mine in Nova Scotia, Year Ending September 30, 1914.

| Company. | UNDERGROUND. | | | | SURFACE. | | | | CONSTRUCTION. | | | TOTALS. | | HORSES. | | Pit days. |
|---|-----------------|------------|-------|-----------|-----------------|------------|-------|---------|-----------------|------------|-------|----------|-----------|---------|--------|-----------|
| | Skilled labour. | Labourers. | Boys. | Days. | Skilled labour. | Labourers. | Boys. | Days. | Skilled labour. | Labourers. | Days. | Persons. | Days. | Above. | Below. | |
| Dominion Coal Co. | 3,552 | 2,102 | 273 | 1,528,469 | 638 | 398 | 70 | 283,520 | ..... | ..... | ..... | 7,033 | 1,811,989 | 79 | 443 | 263 |
| Nova Scotia Steel and Coal Co. | 1,069 | 959 | 260 | 616,270 | 161 | 246 | 29 | 129,114 | ..... | ..... | ..... | 2,724 | 745,384 | 3 | 72 | 281 |
| Cumberland Railway and Coal Co. | 486 | 298 | 52 | 240,517 | 83 | 99 | 14 | 56,299 | 4 | 4 | 634 | 1,040 | 297,510 | 10 | 48 | 282 |
| Acadia Coal Co. | 461 | 468 | 58 | 234,516 | 88 | 233 | 18 | 94,764 | ..... | ..... | ..... | 1,326 | 329,280 | 22 | 49 | 216 |
| Intercolonial Coal Co. | 368 | 140 | 56 | 144,442 | 69 | 97 | 24 | 51,340 | 4 | 4 | 1,818 | 762 | 197,600 | 12 | 25 | 253 |
| Joggins Mines. | 315 | 70 | 4 | 90,364 | 24 | 44 | 4 | 19,584 | 5 | 2 | 1,284 | 468 | 111,232 | 5 | 9 | 243 |
| Chignecto Mines. | 50 | 7 | 3 | 5,980 | 4 | 7 | 3 | 1,810 | ..... | ..... | ..... | 74 | 7,790 | 1 | 1 | 139 |
| Inverness Railway and Coal Co. | 316 | 164 | 25 | 133,071 | 49 | 70 | 16 | 35,421 | ..... | ..... | ..... | 640 | 168,492 | 7 | 39 | 263 |
| Sydney Coal Co. | 8 | 4 | ..... | 2,715 | 2 | 2 | ..... | 1,202 | ..... | ..... | ..... | 16 | 3,917 | 1 | 2 | 262 |
| Mimdie Coal Co. | 148 | 24 | 16 | 41,423 | 34 | 26 | 10 | 18,784 | 4 | 1 | 872 | 263 | 61,079 | 4 | 3 | 222 |
| Colonial Coal Co. | 76 | 24 | ..... | 26,720 | 20 | 17 | ..... | 9,274 | ..... | ..... | ..... | 137 | 35,994 | 3 | 18 | 254 |
| Atlantic Grindstone and Coal Co. | 4 | 1 | ..... | 988 | 1 | ..... | 1 | 592 | ..... | ..... | ..... | 7 | 1,580 | ..... | ..... | 164 |
| Cape Breton Coal, Iron and Railway Co. | 45 | 31 | ..... | 25,727 | 16 | 40 | ..... | 17,171 | 11 | 5 | 5,041 | 148 | 47,939 | 6 | 3 | 302 |
| Totals. | 6,898 | 4,292 | 747 | 3,091,262 | 1,189 | 1,279 | 189 | 718,875 | 28 | 16 | 9,649 | 14,638 | 3,918,786 | 153 | 712 | ..... |

New Brunswick.

From returns made by operators, to the Mines Branch, the production of coal in New Brunswick in 1914 is computed as 98,049 tons. This figure exceeds the 1913 production by 27,738 tons, or 39.45 per cent.

Prior to 1914 the figures used in the Table of Annual Production were computed from statistics of coal shipments furnished by the New Brunswick Department of Public Works.

The coal-producing area is the Grand Lake coal-field in Queens and Sunbury counties. The chief operator is The Minto Coal Company, with a production in 1914 of 78,794 tons. The Rothwell Coal Company produced 12,898 tons, the Northfield Coal Company 5,965 tons, and A. J. McEvoy 392 tons.

Annual Production of Coal in New Brunswick.

| Calendar Year. | Tons. | Value. | Value per ton. | Calendar Year. | Tons. | Value. | Value per ton. |
|----------------|--------|--------|----------------------|----------------|--------|---------|----------------------|
| | | \$ | \$ cts. | | | \$ | \$ cts. |
| 1887..... | 10,040 | 23,607 | 2 35 | 1901..... | 17,630 | 51,857 | 2 94 |
| 1888..... | 5,730 | 11,050 | 1 93 | 1902..... | 18,795 | 39,680 | 2 11 |
| 1889..... | 5,673 | 11,733 | 2 07 | 1903..... | 16,000 | 40,000 | 2 50 |
| 1890..... | 7,110 | 13,850 | 1 95 | 1904..... | 9,112 | 18,224 | 2 00 |
| 1891..... | 5,422 | 11,030 | 2 03 | 1905..... | 29,400 | 58,800 | 2 00 |
| 1892..... | 6,768 | 9,375 | 1 39 | 1906..... | 34,076 | 68,152 | 2 00 |
| 1893..... | 6,200 | 9,837 | 1 59 | 1907..... | 34,584 | 77,814 | 2 25 |
| 1894..... | 6,469 | 10,264 | 1 59 | 1908..... | 60,000 | 135,000 | 2 25 |
| 1895..... | 9,500 | 14,250 | 1 50 | 1909..... | 49,029 | 98,496 | 2 25 |
| 1896..... | 7,500 | 11,250 | 1 50 | 1910..... | 55,455 | 110,910 | 2 00 |
| 1897..... | 6,000 | 9,000 | 1 50 | 1911..... | 55,781 | 111,562 | 2 00 |
| 1898..... | 6,160 | 9,240 | 1 50 | 1912..... | 44,780 | 89,560 | 2 00 |
| 1899..... | 10,528 | 15,792 | 1 50 | 1913..... | 70,311 | 166,637 | 2 37 |
| 1900..... | 10,000 | 15,000 | 1 50 | 1914..... | 98,049 | 241,075 | 2 46 |

Saskatchewan.

The coal deposits of Saskatchewan furnish coal of the lignite variety only. As some of the physical characteristics of this lignite in its raw state prevent its successful and economical use, the yearly production of recent years shows only a slight increase, in no way comparable with the increase in population of the Province, and the consequent increased demand for fuel for heating, and for generation of power. The importance of devising better methods for utilizing this lignite, of which vast quantities exist in the adjacent Province of Alberta, as well as in the Province of Saskatchewan, has prompted both the Government of the Province of Saskatchewan, and the Fuel Testing Division of the Mines Branch, Ottawa, to undertake investigations of western lignites. The results of these investigations are now available.¹

¹ "The carbonizing and briquetting of Lignite," by S. M. Darling, 1915. Investigation for the Government of the Province of Saskatchewan.

Results of the Investigation of Six Lignite Samples obtained from the Province of Alberta, by Haanel and Blizzard, 1915. Mines Branch publication No. 331.

The 1914 production (from 27 separate collieries) amounted to 232,299 tons valued at \$374,245, an increase of 19,402 tons, or 9.1 per cent over the production of 1913. The total 1914 sales, amounting to 217,898 tons were sold for consumption in Canada, and 14,401 tons were used by producers for colliery consumption, by workmen, and in brick making.

The output of coal comes chiefly from the vicinity of Estevan, located on the Souris river, near the southeastern corner of the Province. Coal deposits exist for 75 or 100 miles in a northwest southeast direction along the Souris river, on Big Muddy creek draining Willowbunch lake (only lately reached by a branch line railway) and on the north branch of the Saskatchewan river about 100 miles southwest of Saskatoon.

Annual Production of Coal in Saskatchewan.

| Calendar Year. | Tons. | Value. | Average value per ton. | Calendar Year. | Tons. | Value. | Average value per ton. |
|----------------|------------|--------|------------------------|----------------|---------|---------|------------------------|
| | | \$ | \$ cts. | | | \$ | \$ cts. |
| 1887..... | (a) 400 | 800 | 2 00 | 1902..... | 70,400 | 112,640 | 1 52 |
| 1890..... | 200 | 200 | 1 00 | 1903..... | 116,703 | 169,618 | 1 45 |
| 1891..... | | | | 1904..... | 124,885 | 187,021 | 1 50 |
| 1892..... | 5,400 | 9,325 | 1 73 | 1905..... | 107,596 | 152,334 | 1 42 |
| 1893..... | 8,325 | 12,485 | 1 50 | 1906..... | 108,398 | 164,146 | 1 51 |
| 1894..... | (b) 15,051 | 15,153 | 1 01 | 1907..... | 151,232 | 252,437 | 1 67 |
| 1895..... | 15,769 | 31,538 | 2 00 | 1908..... | 150,556 | 253,790 | 1 69 |
| 1896..... | 16,706 | 25,059 | 1 50 | 1909..... | 192,125 | 296,339 | 1 54 |
| 1897..... | 25,000 | 37,500 | 1 50 | 1910..... | 181,156 | 293,923 | 1 62 |
| 1898..... | 25,000 | 37,500 | 1 50 | 1911..... | 206,779 | 347,248 | 1 68 |
| 1899..... | 25,000 | 37,500 | 1 50 | 1912..... | 225,342 | 368,135 | 1 63 |
| 1900..... | 40,500 | 60,750 | 1 50 | 1913..... | 212,897 | 358,192 | 1 68 |
| 1901..... | 45,000 | 72,000 | 1 60 | 1914..... | 232,299 | 374,245 | 1 61 |

(a) From Turtle Mountain district, Manitoba.

(b) Including a small quantity from the Turtle Mountain district, Manitoba.

Alberta.

Lignite, bituminous, and anthracite coals are all produced in Alberta. Bituminous coal comprises over 50 per cent of the production; lignite, between 40 and 45 per cent, and anthracite, less than 5 per cent.

As mentioned in the notes on the Saskatchewan production, the vast tonnage of lignites available in the western provinces has prompted investigations with a view to the better utilization of these lignites. The results of the investigation of Alberta samples by the Fuel Testing Division of the Mines Branch, Ottawa, are now available.¹

In 1914 the total production of coal in Alberta, as computed from returns from operators, was 3,683,015 tons valued at \$9,350,392 or an average of \$2.54 per ton as compared with a production in 1913 of 4,014,755 tons, valued at \$2.59 per ton, a decrease in tonnage of 8.26 per cent.

This was the second largest year's production in the history of the Province, and as it exceeded the British Columbia production, Alberta maintained its position as the second largest coal-producing province.

¹ Results of the Investigation of Six Lignite Samples obtained from the Province of Alberta, by Haanel and Blizard, 1915, Mines Branch publication No. 331.

Many new operators are producing coal each year, and it is difficult to keep an accurate list of them. The figures of production as compiled by this Division, and by the Provincial Department of Public Works are not in exact agreement, though the differences are now comparatively small. There were 35 companies with a production of over 10,000 tons each, which contributed over 91 per cent of the 1914 production. Nine of these, with a production of over 100,000 tons each, contributed 64.6 per cent of the total.

As shown in tables on page 207, the 1914 sales for export to the United States were 105,699 tons, a decrease from 1913 exports of 24.24 per cent, and for domestic consumption 3,218,234 tons, a decrease of 8.77 per cent.

Tables of the production of coal by companies in 1914 and 1913, and of the annual production as compiled from the records of this Division, follow.

Production of Coal in Alberta, in 1914, by Principal Collieries.

| Name of company. | Days in operation. | Total sales. | Total colliery consumption* | Total production. |
|--|--------------------|--------------|-----------------------------|-------------------|
| Alberta Coal Mfg. Co., Cardiff..... | 175 | 46,690 | 3,000 | 49,690 |
| Battle River Collieries, Rosenroll..... | 224 | 10,298 | 1,267 | 11,565 |
| Brazeau Collieries, Ltd., Nordegg..... | 290 | 153,011 | 2,311 | 155,322 |
| Canada West Coal Co., Taber..... | 87 | 45,744 | 15,064 | 60,808 |
| Can. Coal & Coke Co., Ltd., Beaver Mines..... | 112 | 28,055 | 5,323 | 33,378 |
| " " " Lethbridge..... | 151 | 98,381 | 13,065 | 111,446 |
| " " " Pacific Pass..... | 283 | 85,709 | 4,208 | 89,917 |
| Canmore Coal Co., Ltd., Canmore..... | 241 | 158,137 | 12,385 | 170,522 |
| Can. Pacific Railway, Bankhead..... | 237 | (a) 151,513 | (b) 34,657 | 186,170 |
| " " " Lethbridge No. 1..... | 184 | 135,965 | 32,057 | 168,022 |
| " " " No. 2..... | 189 | 230,071 | 39,104 | 269,175 |
| Capital Coal Co., Cardiff..... | 179 | 33,363 | 1,591 | 34,954 |
| Cardiff Collieries, Ltd., Cardiff..... | 176 | 126,000 | 5,025 | 131,025 |
| Chinook Coal Co., Canmore..... | 191 | 59,771 | 8,710 | 68,481 |
| City of Lethbridge Coal Mine, Lethbridge..... | 261 | 11,323 | ..... | 11,323 |
| Davenport Coal Co., Burmis..... | 70 | 10,560 | 647 | 11,207 |
| Dawson Coal Co., Edmonton..... | 249 | 21,340 | 650 | 21,990 |
| Dobell Coal Co., Tofield..... | 269 | 18,479 | 1,874 | 20,353 |
| Edmonton Standard Coal Co., Edmonton..... | 293 | 12,869 | 1,606 | 14,475 |
| Franco-Can. Collieries, Ltd., Frank..... | 268 | 29,423 | 13,317 | 42,740 |
| Georgetown Collieries Ltd. (The), Canmore..... | 266 | 35,318 | 3,581 | 38,899 |
| Hillcrest Collieries, Ltd., Hillcrest..... | 211 | 203,308 | 10,672 | 213,980 |
| Humberstone Coal Co., Clover Bar..... | 285 | 69,000 | 5,600 | 74,600 |
| International Coal & Coke Co., Coleman..... | 226 | (c) 218,543 | 21,049 | 239,592 |
| Jasper Park Collieries, Ltd., Pocahontas..... | 279 | 74,213 | 4,014 | 78,227 |
| Leitch Colliery, Ltd., Passburg..... | 243 | 57,401 | 4,024 | 61,425 |
| McGillivray Ck. Coal & Coke Co., Coleman..... | 252 | 184,965 | 5,646 | 190,611 |
| Midland Collieries, Ltd., Drumheller..... | 165 | 15,000 | 1,750 | 16,750 |
| Mountain Park Coal Co., Ltd., Bickerdike..... | 273 | 79,210 | 3,783 | 82,993 |
| Newcastle Coal Co., Drumheller..... | 211 | 60,000 | 950 | 60,950 |
| Pembina Coal Co., Ltd., Evansburg..... | 276 | 31,896 | 6,920 | 38,816 |
| Redcliff Brick & Coal Co., Redcliff..... | 191 | 10,662 | ..... | 10,662 |
| Rock Springs Coal & Brick Co., Elcan..... | 169 | 17,655 | 2,200 | 19,855 |
| Rosedale Coal & Clay Products Co., Rosedale..... | 203 | 21,211 | 177 | 21,388 |
| Tofield Coal Co., Tofield..... | 284 | 21,351 | 1,200 | 22,551 |
| Twin City Coal Co., Edmonton..... | 235 | 36,914 | 3,553 | 40,467 |
| West Can. Collieries, Bellevue..... | 228 | 389,960 | 16,471 | 406,431 |
| " " " Blairmore..... | 38 | 18,931 | 1,117 | 20,048 |
| Two other companies each producing over 10,000 tons..... | ..... | 51,440 | 7,815 | 59,255 |
| | | 3,063,680 | 296,383 | 3,360,063 |
| All other companies each under 10,000 tons..... | ..... | 304,502 | 18,450 | 322,952 |
| Total production, Alberta..... | | 3,368,182 | 314,833 | 3,683,015 |

* Same as 1913 report.

(a) Briquettes 107,809; (b) Briquettes 1,261; (c) For manufacture of coke 44,249.

Production of Coal in Alberta, in 1913, by Principal Collieries.

| Name of company. | Days in operation. | Total sales. | Total for colliery use.* | Total production. |
|--|--------------------|----------------------|--------------------------|----------------------|
| Alberta Coal Mining Co., Cardiff..... | 227 | 55,000 | 3,000 | 58,000 |
| Canada West Coal Co., Taber..... | 264 | 106,521 | 10,041 | 11,656 |
| Can. Coal & Coke Co., Beaver Mines..... | 216 | 72,869 | 3,742 | 76,611 |
| " " Lethbridge..... | 252 | 117,995 | 29,278 | 147,273 |
| " " Pacific Pass..... | 285 | 36,432 | 10,101 | 46,533 |
| Canmore Coal Co., Ltd., Canmore..... | 227 297 | 242,662 | 11,516 | 254,178 |
| Canadian Pacific Ry., Dept. Nat. Res., Bankhead.. | 290 | (a) 162,899 | (b) 35,276 | 198,175 |
| " " Lethbridge.. | 255 | 364,600 | 3,933 | 368,533 |
| Capital Coal Co., Cardiff..... | 202 | 34,374 | 1,090 | 35,464 |
| Cardiff Collieries, Ltd., Cardiff..... | 256 | 120,000 | 4,900 | 124,900 |
| Chinook Coal Co., Canmore..... | 282 | 65,242 | 4,859 | 70,101 |
| City of Lethbridge Coal Mine, Lethbridge..... | 237 | 11,641 | | 11,641 |
| Coalbeck C. & Clay Prod. Co., Castor..... | 235 | 10,950 | | 11,115 |
| Davenport Coal Co., Burmis..... | 255 | 71,374 | 2,970 | 74,344 |
| Dawson Coal Co., Edmonton..... | 267 | 12,860 | 600 | 13,460 |
| Diamond Coal Co., Ltd., Diamond City..... | 119 | 16,952 | 1,603 | 18,555 |
| Dobell Coal Co., Tofield..... | 290 | 18,717 | 1,595 | 20,312 |
| Edmonton Standard Coal Co., Edmonton..... | 287 | 19,500 | 1,400 | 20,900 |
| Great West Coal Co., Clover Bar..... | 288 | 46,835 | 5,121 | 51,956 |
| Hillcrest Collieries, Ltd., Hillcrest..... | 289 | 310,732 | 11,737 | 322,469 |
| Humberstone Coal Co., Clover Bar..... | 240 | 22,608 | 1,125 | 23,733 |
| International Coal and Coke Co., Coleman..... | 297 | (c) 387,030 | 26,536 | 413,566 |
| Jasper Park Collieries, Ltd., Pocatontas..... | 272 | 132,844 | 2,185 | 135,029 |
| Keith & Fulton Coal Co., Clover Bar..... | 249 | 10,239 | 25 | 10,264 |
| Leitch Colliery, Ltd., Passburg..... | 271 | 104,093 | 4,494 | 108,587 |
| McGillivray Creek Coal and Coke Co., Coleman.... | 286 | 189,091 | 6,158 | 195,249 |
| Newcastle Coal Co., Drumheller..... | | 24,279 | 1,200 | 25,479 |
| Ottewell Coal Co., Clover Bar..... | 278 | 11,316 | 150 | 11,466 |
| Pembina Coal Co., Ltd., Evansburgh..... | 300 | 5,826 | 4,323 | 10,149 |
| Rock Springs Coal and Brick Co., Elcan..... | 190 | 16,500 | 2,300 | 18,800 |
| Tofield Coal Co., Tofield..... | 223 | 15,120 | 1,150 | 16,270 |
| Twin City Coal Co., Ltd., Edmonton..... | 280 | 60,985 | 5,618 | 66,603 |
| West Canadian Collieries, Bellevue..... | 270 | 426,756 | 7,301 | 434,057 |
| " " Blairmore..... | 278 | 159,870 | 4,202 | 164,072 |
| Yellowhead Pass Coal and Coke Co., Ltd., via Bickerdike..... | 297 | 27,772 | 2,327 | 30,099 |
| Four other companies, each producing over 10,000 tons..... | | 70,653 | 17,995 | 88,648 |
| All other companies, each producing under 10,000 tons..... | | 3,563,137 208,248 | 230,016 13,354 | 3,793,153 221,602 |
| Total production, Alberta..... | | 3,771,385 | 243,370 | 4,014,755 |

*Includes consumption under boilers, etc., and coal used by workmen.

(a) " 129,493 tons of briquettes.

| | |
|-----|---------|
| (a) | 129,493 |
| (b) | 1,275 |

(c) " 104,012 tons for coke manufacturing.

Annual Production of Coal in Alberta.

| Calendar Year. | Tons. | Value. | Average value per ton. | Calendar Year | Tons. | Value. | Average value per ton. |
|----------------|---------|---------|------------------------|---------------|-----------|------------|------------------------|
| | | \$ | \$ cts. | | | \$ | \$ cts. |
| 1887..... | 74,152 | 157,577 | 2 13 | 1901..... | 340,275 | 850,687 | 2 50 |
| 1888..... | 115,124 | 183,354 | 1 59 | 1902..... | 402,819 | 960,601 | 2 38 |
| 1889..... | 97,364 | 179,640 | 1 85 | 1903..... | 495,893 | 1,117,541 | 2 25 |
| 1890..... | 128,753 | 198,298 | 1 54 | 1904..... | 661,732 | 1,404,524 | 2 12 |
| 1891..... | 174,131 | 437,243 | 2 51 | 1905..... | 931,917 | 1,993,915 | 2 14 |
| 1892..... | 178,970 | 460,605 | 2 57 | 1906..... | 1,246,360 | 2,614,762 | 2 10 |
| 1893..... | 230,070 | 586,260 | 2 55 | 1907..... | 1,591,579 | 3,836,286 | 2 41 |
| 1894..... | 184,940 | 473,827 | 2 56 | 1908..... | 1,685,661 | 4,127,311 | 2 45 |
| 1895..... | 169,885 | 382,526 | 2 25 | 1909..... | 1,994,741 | 4,838,109 | 2 43 |
| 1896..... | 209,162 | 581,832 | 2 78 | 1910..... | 2,894,469 | 7,065,736 | 2 44 |
| 1897..... | 242,163 | 630,408 | 2 60 | 1911..... | 1,511,036 | 3,979,264 | 2 63 |
| 1898..... | 315,088 | 788,720 | 2 50 | 1912..... | 3,240,577 | 8,113,525 | 2 50 |
| 1899..... | 309,600 | 774,000 | 2 50 | 1913..... | 4,014,755 | 10,418,941 | 2 59 |
| 1900..... | 311,450 | 778,625 | 2 50 | 1914..... | 3,683,015 | 9,350,392 | 2 54 |

Statistics prepared by Mr. John T. Stirling, Chief Inspector of Coal Mines, in Alberta, covering coal mining operations in 1914 are given in the following tables. The output as given by Mr. Stirling is 3,821,739 tons. Sales for consumption in Alberta are stated as 2,352,184 tons, which is 61.5 per cent of the total production. In making briquettes 80,592 tons were used, and in making coke 44,249 tons. As compared with 1913 the Crowsnest Pass District production showed a decrease of 33 per cent, Calgary an increase of 37 per cent, Lethbridge a decrease of 19 per cent, and Edmonton an increase of 8.6 per cent.

Output of Coal in Alberta, 1914

| Tons of 2,000 lbs. | Crowsnest pass. | Calgary. | Lethbridge. | Edmonton. | Total. |
|---|--------------------|----------|-------------|-----------|-----------|
| Sold for consumption in Alberta..... | 948,803 | 515,107 | 196,522 | 691,752 | 2,352,184 |
| Sold for consumption in other prov- inces..... | 70,006 | 145,981 | 455,166 | 118,671 | 789,824 |
| Sold for export to the United States.. | 102,116 | 2,853 | 1,118 | ..... | 106,087 |
| Total Sales..... | 1,120,925 | 663,941 | 652,806 | 810,423 | 3,248,095 |
| Used in making briquettes..... | ..... | 80,592 | ..... | ..... | 80,592 |
| Used in making coke..... | 44,249 | ..... | ..... | ..... | 44,249 |
| Used under colliery boilers..... | 63,942 | 59,777 | 102,527 | 58,716 | 284,962 |
| Difference in stocks..... | + 10,396 | + 1,318 | - 2,884 | + 1,088 | + 9,918 |
| Slack put on waste heap..... | 285 | 55,794 | 30,241 | 67,603 | 153,923 |
| Total output..... | 1,239,797 | 861,422 | 782,690 | 937,830 | 3,821,739 |

Output of Bituminous Coal in Alberta, 1914

| Tons of 2,000 lbs. | Crowsnest pass. | Calgary. | Lethbridge. | Edmonton | Total. |
|---|--------------------|----------|-------------|----------|-----------|
| Sold for consumption in Alberta.... | 948,803 | 328,022 | ..... | 286,945 | 1,563,770 |
| Sold for consumption in other prov- inces..... | 70,006 | 18,290 | ..... | 23,065 | 111,361 |
| Sold for export to the United States.. | 102,116 | 2,643 | ..... | ..... | 104,759 |
| Total sales..... | 1,120,925 | 348,955 | ..... | 310,010 | 1,779,890 |
| Used in making coke..... | 44,249 | ..... | ..... | ..... | 44,249 |
| Used under colliery boilers..... | 63,942 | 18,097 | ..... | 15,408 | 97,447 |
| Difference in stocks..... | + 10,396 | + 448 | ..... | + 644 | + 11,488 |
| Slack put on waste heap..... | 285 | 11,233 | ..... | 8,775 | 20,293 |
| Total..... | 1,239,797 | 378,733 | ..... | 334,837 | 1,953,367 |

Output of Anthracite Coal in Alberta, 1914

| Tons of 2,000 lbs. | CALGARY DISTRICT. | |
|--|-------------------|-------------|
| | Coal. | Briquettes. |
| Sold for consumption in Alberta..... | 24,158 | 94,195 |
| Sold for consumption in other provinces..... | 19,456 | 14,693 |
| Sold for export to the United States..... | 210 | 30 |
| Total sales..... | 43,824 | 108,918 |
| Used under colliery boilers..... | 33,276 | 162 |
| Used in making briquettes..... | 80,592 | ..... |
| Difference in stock..... | + 95 | + ? |
| Stock put on waste heap..... | 13,184 | ..... |
| Total..... | 170,971 | 109,082 |

Output of Lignite Coal in Alberta, 1914.

| Tons of 2,000 lbs. | Crowsnest pass. | Calgary. | Lethbridge. | Edmonton | Total. |
|--|-----------------|----------|-------------|----------|-----------|
| Sold for consumption in Alberta..... | | 162,927 | 196,522 | 404,807 | 764,256 |
| Sold for consumption in other provinces..... | | 108,235 | 455,166 | 95,606 | 659,007 |
| Sold for export to the United States..... | | | 1,118 | | 1,118 |
| Total sales..... | | 271,162 | 652,806 | 500,413 | 1,424,381 |
| Used under colliery boilers..... | | 8,404 | 102,527 | 43,308 | 154,239 |
| Slack put on waste heap..... | | 31,377 | 30,241 | 58,828 | 120,446 |
| Difference in stocks..... | | + 775 | - 2,884 | + 444 | - 1,665 |
| Total output..... | | 311,718 | 782,690 | 602,993 | 1,697,401 |

Output of Coal in Alberta by Districts, 1914.

| District. | Number of persons employed. | Lignite. | Bituminous. | Anthracite. |
|----------------------|-----------------------------|-----------|-------------|-------------|
| Crowsnest Pass..... | 1,939 | | 1,208,342 | |
| Pincher Creek..... | 108 | | 31,455 | |
| Lethbridge..... | 1,512 | 638,342 | | |
| Taber..... | 399 | 121,033 | | |
| Bow Island..... | 69 | 11,587 | | |
| Milk River..... | 26 | 3,704 | | |
| Banff..... | 826 | | 221,382 | 170,971 |
| Medicine Hat..... | 177 | 38,445 | | |
| Okotoks..... | 25 | 5,516 | | |
| Aldersyde..... | 25 | 8,024 | | |
| Carstairs..... | 15 | 590 | | |
| Carbon..... | 28 | 7,972 | | |
| Trochu..... | 24 | 5,309 | | |
| Drumheller..... | 508 | 161,755 | | |
| Three Hills..... | 84 | 8,283 | | |
| Lacombe..... | 138 | 42,691 | | |
| Wetaskiwin..... | 129 | 41,157 | | |
| Brazeau..... | 342 | | 157,351 | |
| Edmonton..... | 526 | 254,904 | | |
| St. Albert..... | 67 | 10,420 | | |
| Tofield..... | 95 | 49,056 | | |
| Cardiff..... | 248 | 229,991 | | |
| Pembina..... | 124 | 58,622 | | |
| Yellowhead Pass..... | 581 | | 253,647 | |
| Jasper Park..... | 155 | | 81,190 | |
| Total..... | 8,170 | 1,697,401 | 1,953,367 | 170,971 |

Average Number of Persons Employed in Alberta Coal Mines.

| Character of labour. | Bituminous. | | Anthracite. | | Lignite. | | Total. | |
|--|-------------|--------|-------------|--------|----------|--------|--------|--------|
| | Above. | Below. | Above. | Below. | Above. | Below. | Above. | Below. |
| Supervision and clerical assistance..... | 116 | 121 | 10 | 11 | 146 | 166 | 272 | 298 |
| Miners and helpers..... | | 1,714 | | 158 | | 2,264 | | 4,136 |
| Mechanics or skilled labour..... | 221 | 64 | 56 | 1 | 229 | 157 | 506 | 222 |
| Other employees..... | 560 | 733 | 126 | 60 | 654 | 603 | 1,340 | 1,396 |
| Total..... | 897 | 2,632 | 192 | 230 | 1,029 | 3,190 | 2,118 | 6,052 |

British Columbia.

In 1914 the total production of coal in British Columbia was 2,239,799 tons valued at \$6,999,374 as compared with 2,714,420 tons in 1913 valued at \$8,482,562, a decrease of over 17 per cent in tonnage. By districts the production was as follows: Crowsnest and East Kootenay 1,066,724 tons, a decrease of 21·8 per cent; Nicola and Princeton 155,392 tons, a decrease of 47·2 per cent, and Vancouver island 1,017,683 tons, an increase of 9·6 per cent.

As to the cause of the decrease from the 1913 production the Provincial Mineralogist in his annual report for 1914 says:—

“The decreased coal output is undoubtedly entirely attributable to the war, not acting directly but through the allied industries which serve as consumers of colliery products, an illustration of the interlocking modern commercial business.”

In the interior of the Province the immediate effect of the war was the closing of metal mines and smelters, owing to the disturbance of the metal markets. This cut off at once a large market for coal and resulted in lessened consumption of fuel by the railways.

On the coast, the war affected the coal production through the decrease of ocean trade caused by the presence of German cruisers on the Pacific. According to the Provincial Mineralogist, although a strike was “nominally in progress” on Vancouver island until August, this did not affect the production as much as in the previous year; and, as to the competition of California crude oil, for fuel, he says this “continued to be felt though not in a larger degree than in 1913.”

The 1914 production on comparison with that of recent years is seen to be the smallest since 1906. This is probably explained by the increasing use of crude oil for fuel, the 1914 importation of fuel oil into the four western provinces, as mentioned earlier in this report, having displaced approximately 1,100,000 tons of coal of Nanaimo grade. Had such an additional tonnage of coal been produced in 1914 the year's production would have been the largest on record.

The consumption of British Columbia coal is confined to the Province and to the adjacent States of Montana and Washington. In 1914 the sales for domestic consumption were 43 per cent of the production, and those for export 30 per cent of the total, coke manufacture absorbed 18 per cent, and 9 per cent was used around collieries and by workmen. The domestic consumption in 1914 fell off 26 per cent from that of 1913 and the consumption for coke-making 18 per cent, while sales for export to the United States showed a decrease of only 3·3 per cent.

The three largest operators were the Crowsnest Pass Coal Company with 867,891 tons, the Canadian Collieries (Dunsmuir), Limited, with 433,889 tons, and the Western Fuel Company with 340,676 tons. These

three companies contributed over 73 per cent of the Province's production. In all there were eleven operating companies.

There is a wide variation in the prices realized on coal sales in different parts of the Province. In East Kootenay as low a price as \$2.25 per long ton is paid, while on Vancouver island the price may reach \$4.50. For purposes of this report a value of \$3.50 is assumed.

Coal Production by Districts in British Columbia, 1914.

| Coal. | Vancouver Island. | Nicola and Princeton. | Crowsnest and East Kootenay. | Total. |
|---|----------------------|-----------------------------|------------------------------------|-----------|
| | Tons. | Tons. | Tons. | Tons. |
| Sold for consumption in Canada..... | 674,928 | 134,995 | 159,598 | 969,521 |
| Sold for export to United States..... | 236,004 | 3,006 | 436,109 | 675,119 |
| Sold for export to other countries..... | | | | |
| Total sales..... | 910,932 | 138,001 | 595,707 | 1,644,640 |
| Used for making coke or brick..... | | | 398,117 | 398,117 |
| Used for colliery consumption, etc..... | 106,751 | 17,391 | 72,900 | 197,042 |
| Production..... | 1,017,683 | 155,392 | 1,066,724 | 2,239,799 |

Coal Production by Districts in British Columbia, 1913.

| Coal. | Vancouver Island. | Nicola and Princeton. | Crowsnest and East Kootenay. | Total. |
|---|----------------------|-----------------------------|------------------------------------|-----------|
| | Tons. | Tons. | Tons. | Tons. |
| Sold for consumption in Canada..... | 715,259 | 276,528 | 319,856 | 1,311,643 |
| Sold for export to United States..... | 107,885 | | 590,935 | 698,820 |
| Sold for export to other countries..... | | | | |
| Total sales..... | 823,144 | 276,528 | 910,791 | 2,010,463 |
| Used for making coke or brick..... | | | 485,271 | 485,271 |
| Used for colliery consumption, etc..... | 104,736 | 17,903 | 96,047 | 218,686 |
| Production..... | 927,880 | 294,431 | 1,492,109 | 2,714,420 |

Coal Production by Collieries in British Columbia, in 1914, in Short Tons.

| Colliery | SALES | | | Used in making coke. | Used under colliery boilers, etc. | Production | Lost in washing, etc. | STOCKS | | Output. |
|--|------------|-------------------|-----------|----------------------|-----------------------------------|------------|-----------------------|----------------|---------------|-----------|
| | In Canada. | To United States. | Total. | | | | | First of year. | Last of year. | |
| 1. Protection, No. 1..... | 149,677 | 140,711 | 290,388 | ..... | .. 49,505 | 339,893 | ..... | 290 | 7,699 | 347,302 |
| 2. Northfield and Reserve..... | 248 | 40 | 288 | ..... | .. 495 | 783 | ..... | 295 | 44 | 532 |
| 3. New East Wellington..... | 100,294 | 8,111 | 108,405 | ..... | 10,793 | 119,198 | ..... | 4,279 | 5,099 | 120,018 |
| 4. Ladysmith (Wellington)..... | 88,396 | 16,953 | 105,349 | ..... | 9,352 | 114,701 | 26,113 | 830 | 4,738 | 144,722 |
| 5. Cumberland (Comox)..... | 247,616 | 54,005 | 301,621 | ..... | 17,567 | 319,188 | 115,386 | 11,656 | 19,180 | 442,098 |
| 6. Fiddick, Richardson, Squash and Morden..... | 88,697 | 16,184 | 104,881 | ..... | 19,039 | 123,925 | 21,116 | 1,148 | 2,434 | 146,322 |
| 7. Michel..... | 39,857 | 71,720 | 111,577 | ..... | 93,882 | 18,466 | ..... | ..... | 1,312 | 225,237 |
| 8. Coal Creek..... | 60,423 | 304,231 | 364,654 | ..... | 237,790 | 643,966 | ..... | 105 | 2,714 | 646,575 |
| 9. Hosmer..... | 39,109 | 66,158 | 105,267 | ..... | 10,048 | 115,602 | 17,064 | 330 | 0 | 132,336 |
| 10. Corbin..... | 20,209 | 60,367 | 80,576 | ..... | 2,864 | 83,231 | ..... | 688 | 366 | 83,231 |
| 11. Middlesboro..... | 58,491 | ..... | 58,491 | ..... | 9,796 | 68,287 | ..... | ..... | ..... | 67,965 |
| 12. Inland..... | 57,782 | ..... | 57,782 | ..... | 2,952 | 60,734 | ..... | ..... | ..... | 60,734 |
| 13. Princeton..... | 14,862 | 2,806 | 17,668 | ..... | 3,523 | 21,191 | 626 | 45 | 0 | 21,772 |
| 14. Other mines..... | 3,860 | 200 | 4,060 | ..... | 1,120 | 5,180 | ..... | ..... | ..... | 5,180 |
| Total..... | 969,521 | 675,119 | 1,644,640 | 398,117 | 197,042 | 2,239,799 | 180,305 | 19,666 | 43,586 | 2,444,024 |

1. Western Fuel Co.
 2. Vancouver-Nanaimo Coal Mining Co.
 3. The Canadian Collieries (Dunsmuir), Ltd.
 4. Pacific Coast Collieries, Ltd.
 5. Crownest Pass Coal Co., Ltd.
 6. The Hosmer Mines Ltd.
 (Can. Pac. Railway, Dept. of Natural Resources).
 7. Corbin Coal and Coke Co., Ltd.
 8. Nicola Valley Coal and Coke Co., Ltd.
 9. Inland Coal and Coke Co., Ltd.
 10. Princeton Coal and Land Co., Ltd.
 11. {Colmont Collieries, Ltd.
 {Pacific Coast Colliery Co. of B. C.

Coal Production by Collieries in British Columbia, in 1913, in Short Tons.

| Colliery. | SALES. | | | Used in making coke. | Used under colliery boilers, etc. | Production. | Lost in washing, etc. | STOCKS. | | Output. |
|--------------------------------|------------|-------------------|-----------|----------------------|-----------------------------------|-------------|-----------------------|----------------|---------------|-----------|
| | In Canada. | To United States. | Total. | | | | | First of year. | Last of year. | |
| 1. Protection, No. 1..... | 133,702 | 34,557 | 168,259 | ..... | 25,785 | 194,044 | ..... | 1,525 | 290 | 192,809 |
| 2. Northfield..... | 17,909 | 22,390 | 40,299 | ..... | 13,388 | 53,687 | ..... | 56 | 294 | 53,925 |
| 3. New East Wellington..... | 89,665 | 21,861 | 111,526 | ..... | 5,650 | 117,176 | 3,098 | 4,594 | 1,182 | 116,862 |
| 4. Ladysmith (Wellington)..... | 47,474 | 520 | 47,994 | ..... | 6,344 | 54,338 | 9,732 | 3,102 | 1,830 | 64,708 |
| 5. Cumberland (Comox)..... | 348,680 | 27,882 | 376,562 | ..... | 39,566 | 416,128 | 144,397 | 3,115 | 11,656 | 596,066 |
| 6. Fiddick and Richardson..... | 75,197 | 675 | 75,872 | ..... | 13,279 | 89,151 | 43,102 | 46,875 | 650 | 86,721 |
| 7. Suquash..... | 2,632 | ..... | 2,632 | ..... | 724 | 3,356 | ..... | ..... | ..... | 86,481 |
| 8. Michel..... | 143,490 | 476,397 | 619,887 | 261,313 | 43,017 | 924,217 | ..... | 115 | 105 | 924,207 |
| 9. Coal Creek..... | 50,703 | 55,737 | 106,440 | 113,299 | 22,547 | 242,286 | ..... | 115 | 0 | 245,171 |
| 10. Hosmer..... | 106,162 | ..... | 106,162 | 110,659 | 27,260 | 244,081 | 21,856 | 778 | 330 | 265,489 |
| 11. Corbin..... | 19,501 | 58,801 | 78,302 | ..... | 3,223 | 81,525 | ..... | ..... | ..... | 87,525 |
| 12. Diamond Vale..... | 6,700 | ..... | 6,700 | ..... | 435 | 7,135 | ..... | ..... | ..... | 7,135 |
| 13. Middlesboro..... | 114,221 | ..... | 114,221 | ..... | 12,878 | 127,099 | ..... | 483 | 622 | 127,238 |
| 14. Inland..... | 127,040 | ..... | 127,040 | ..... | 1,769 | 128,809 | ..... | ..... | ..... | 128,809 |
| 15. Princeton..... | 26,765 | ..... | 26,765 | ..... | 2,810 | 29,575 | 3,354 | 269 | 51 | 37,711 |
| 16. Other mines..... | 1,802 | ..... | 1,802 | ..... | 11 | 1,813 | ..... | ..... | 80 | 1,893 |
| Total..... | 1,311,643 | 698,820 | 2,010,463 | 485,463 | 218,686 | 2,714,420 | 225,539 | 58,209 | 16,090 | 2,897,840 |

1. Western Fuel Co.
2. Vancouver-Nanaimo Coal Mining Co.
3. The Canadian Collieries (Dunsmuir), Ltd.
4. Pacific Coast Collieries, Ltd.
5. Crownst Pass Coal Co., Ltd.
6. The Hosmer Mines, Ltd.
(Can. Pac. Railway, Dept of Natural Resources.)
7. Corbin Coal and Coke Co., Ltd.
8. Diamond Vale Collieries, Ltd.
9. Nicola Valley Coal and Coke Co., Ltd.
10. Inland Coal and Coke Co., Ltd.
11. Princeton Coal and Land Co., Ltd.
12. { United Empire Coal Co., Ltd.
{ Coalmont Collieries.
{ Grand Trunk, B. C. Coal Co.

Annual Production of Coal in British Columbia.

| Calendar Year. | Output, tons, 2,240 lbs. | Home consumption, tons, 2,240 lbs. | Sold for export, tons, 2,240 lbs. | PRODUCTION*. | | Price per ton, 2,240 lbs. | Value. |
|----------------|--------------------------|------------------------------------|-----------------------------------|------------------|------------------|---------------------------|------------|
| | | | | Tons, 2,240 lbs. | Tons, 2,000 lbs. | | |
| | | | | | | \$ cts. | \$ |
| 1836-52.... | 10,000 | | | | 11,200 | 4 00 | 40,000 |
| 1852-59.... | 25,398 | | | | 28,446 | 4 00 | 101,592 |
| 1859†..... | 1,989 | | | | 2,228 | 4 00 | 7,956 |
| 1860..... | 14,247 | | | | 15,957 | 4 00 | 56,988 |
| 1861..... | 13,774 | | | | 15,427 | 4 00 | 55,096 |
| 1862..... | 18,118 | | | | 20,292 | 4 00 | 72,472 |
| 1863..... | 21,345 | | | | 23,906 | 4 00 | 85,380 |
| 1864..... | 28,632 | | | | 32,068 | 4 00 | 114,528 |
| 1865..... | 32,819 | | | | 36,757 | 4 00 | 131,276 |
| 1866..... | 25,115 | | | | 28,129 | 4 00 | 100,460 |
| 1867..... | 31,239 | | | | 34,988 | 4 00 | 124,956 |
| 1868..... | 44,005 | | | | 49,286 | 4 00 | 176,020 |
| 1869..... | 35,080 | | | | 40,098 | 4 00 | 143,208 |
| 1870..... | 29,843 | | | | 33,424 | 4 00 | 119,372 |
| 1871-2-3.... | 148,459 | | | | 166,274 | 4 00 | 593,836 |
| 1874..... | 81,547 | 25,023 | 56,038 | 81,061 | 90,788 | 3 00 | 243,183 |
| 1875..... | 110,145 | 31,252 | 66,392 | 97,644 | 109,361 | 3 00 | 292,932 |
| 1876..... | 139,192 | 17,856 | †122,329 | 140,185 | 157,007 | 3 00 | 420,555 |
| 1877..... | 154,052 | 24,311 | 115,381 | 139,692 | 156,455 | 3 00 | 419,076 |
| 1878..... | 170,846 | 26,166 | 164,682 | 190,848 | 213,750 | 3 00 | 572,544 |
| 1879..... | 241,301 | 40,294 | 192,096 | 232,390 | 260,277 | 3 00 | 697,170 |
| 1880..... | 267,595 | 46,513 | 225,849 | 272,362 | 305,045 | 3 00 | 817,086 |
| 1881..... | 228,357 | 40,191 | 189,323 | 229,514 | 257,056 | 3 00 | 688,542 |
| 1882..... | 282,139 | 56,161 | 232,411 | 288,572 | 323,201 | 3 00 | 865,716 |
| 1883..... | 213,299 | 64,786 | 149,567 | 214,353 | 240,075 | 3 00 | 643,059 |
| 1884..... | 394,070 | 87,388 | 306,478 | 393,866 | 441,130 | 3 00 | 1,181,598 |
| 1885..... | 365,596 | 95,227 | 237,797 | 333,024 | 372,987 | 3 00 | 999,072 |
| 1886..... | 326,636 | 85,987 | 249,205 | 335,192 | 375,415 | 3 00 | 1,005,576 |
| 1887..... | 413,360 | 99,216 | 334,839 | 434,055 | 486,142 | 3 00 | 1,302,165 |
| 1888..... | 489,301 | 115,953 | 365,714 | 481,667 | 539,467 | 3 00 | 1,445,001 |
| 1889..... | 579,830 | 124,574 | 443,675 | 568,249 | 636,439 | 3 00 | 1,704,747 |
| 1890..... | 678,140 | 177,075 | 508,270 | 685,345 | 767,586 | 3 00 | 2,056,035 |
| 1891..... | 1,029,097 | 202,697 | 806,479 | 1,009,176 | 1,130,277 | 3 00 | 3,027,528 |
| 1892..... | 826,335 | 196,223 | 640,579 | 836,802 | 937,218 | 3 00 | 2,510,406 |
| 1893..... | 978,294 | 207,851 | 768,917 | 976,768 | 1,093,980 | 3 00 | 2,930,304 |
| 1894..... | 1,012,953 | 165,776 | 827,642 | 993,418 | 1,112,628 | 3 00 | 2,980,254 |
| 1895..... | 939,654 | 188,349 | 756,334 | 944,683 | 1,058,045 | 3 00 | 2,834,049 |
| 1896..... | 894,882 | 261,984 | 634,238 | 896,222 | 1,003,769 | 3 00 | 2,688,666 |
| 1897..... | 802,296 | 290,310 | 619,860 | 910,170 | 1,019,390 | 3 00 | 2,730,510 |
| 1898..... | 1,136,485 | 375,423 | 752,863 | 1,128,286 | 1,263,680 | 3 00 | 3,384,858 |
| 1899..... | 1,306,324 | 526,058 | 751,711 | 1,277,769 | 1,431,101 | 3 00 | 3,833,307 |
| 1900..... | 1,590,178 | 685,667 | 914,184 | 1,599,851 | 1,791,833 | 3 00 | 4,799,553 |
| 1901..... | 1,691,557 | 799,666 | 914,163 | 1,713,829 | 1,919,488 | 3 00 | 5,141,487 |
| 1902..... | 1,641,626 | 837,871 | 776,809 | 1,614,680 | 1,808,441 | 3 00 | 4,844,040 |
| 1903..... | 1,450,663 | 947,499 | 549,449 | 1,496,948 | 1,676,581 | 3 00 | 4,490,844 |
| 1904..... | 1,685,698 | 1,129,465 | 533,593 | 1,663,058 | 1,862,625 | 3 00 | 4,989,174 |
| 1905..... | 1,736,696 | 1,089,667 | 647,343 | 1,737,010 | 1,945,452 | 3 00 | 5,211,030 |
| 1906..... | 1,899,076 | 1,236,476 | 679,829 | 1,916,305 | 2,146,262 | 3 00 | 5,748,915 |
| 1907..... | 2,219,602 | 1,438,402 | 673,114 | 2,111,516 | 2,364,898 | 3 50 | 7,390,306 |
| 1908..... | 2,111,931 | 1,486,511 | 597,157 | 2,083,668 | 2,333,708 | 3 50 | 7,292,838 |
| 1909..... | 2,388,196 | 1,585,232 | 741,667 | 2,326,899 | 2,606,127 | 3 50 | 8,144,147 |
| 1910..... | 3,152,207 | 1,798,873 | 1,175,007 | 2,973,880 | 3,330,745 | 3 50 | 10,408,580 |
| 1911..... | 2,304,794 | 1,657,422 | 612,696 | 2,270,118 | 2,542,532 | 3 50 | 7,945,413 |
| 1912..... | 2,857,345 | 1,898,213 | 966,963 | 2,865,176 | 3,208,997 | 3 50 | 10,028,116 |
| 1913..... | 2,587,357 | 1,799,643 | 623,946 | 2,423,589 | 2,714,420 | 3 50 | 8,482,562 |
| 1914..... | 2,182,164 | 1,397,036 | 602,785 | 1,999,821 | 2,239,799 | 3 50 | 6,999,374 |

*This production is obtained by adding 'Home Consumption' and 'Sold for Export.'

†52,935 tons of this amount were exported as sales without the division into 'Home Consumption' and 'Sold for Export.'

‡Two months only.

Yukon.

As in 1914 there were two producing companies, the Five Fingers Coal Company, operating at Tantalus, and the Northern Light, Power and Coal Company, on Coal creek. The combined output was 13,443 tons, a decrease of 31·8 per cent.

Annual Production of Coal in Yukon Territory.

| Calendar Year. | Tons. | Value. | Average value per ton. |
|----------------|--------|---------|---------------------------|
| | | \$ | \$ cts . |
| 1901..... | *5,864 | 86,230 | 14 70 |
| 1902..... | 4,910 | 37,280 | 7 59 |
| 1903..... | 1,849 | 29,584 | 16 00 |
| 1904..... | | | |
| 1905..... | 7,000 | 21,000 | 3 00 |
| 1906..... | 7,000 | 28,000 | 4 00 |
| 1907..... | 15,000 | 60,000 | 4 00 |
| 1908..... | 3,847 | 21,158 | 5 50 |
| 1909..... | 7,364 | 49,502 | 6 72 |
| 1910..... | 16,185 | 110,925 | 6 85 |
| 1911..... | 2,840 | 12,780 | 4 50 |
| 1912..... | 9,245 | 44,958 | 4 86 |
| 1913..... | 19,722 | 95,945 | 4 86 |
| 1914..... | 13,443 | 53,760 | 4 00 |

*Part of this production was mined in 1900.

COKE.

Both domestic and imported coal is used in the manufacture of coke in Canadian coke-oven plants. In 1914, 1,038,235 tons of domestic, and 503,312 tons of imported coal were used to produce an output of 1,015,253 tons of coke showing a return of 0·658 tons of coke per ton of coal charged. Coke from by-product ovens comprised 67 per cent of the total.

In 1913 there were 1,698,912 tons of domestic coal, and 549,001 tons of imported coal used to produce an output of 1,517,133 tons of coke. The coke output of 1914 showed, therefore, a decrease of 33 per cent.

The amount of coke sold or used by coke producers was 1,023,860 tons, a decrease of 33·1 per cent. Besides the tonnage sold or used by producers, there was imported during the calendar year 553,046 tons of coke. The exports totalled 67,838 tons. The Canadian consumption for 1914 was therefore 1,509,068 tons, a decrease of 30·97 per cent from 1913. This is the smallest consumption since 1909, the consumption of recent years having been as follows: 1,285,228 tons in 1908, 1,449,369 tons in 1909, 1,581,832 tons in 1910, 1,677,188 tons in 1911, 1,981,832 tons in 1912, and 2,186,170 tons in 1913.

For the first time in its history Ontario led in production with 386,314 tons, all of which was produced by the Algoma Steel Corporation.

At the close of the year there were 2,298 ovens idle, and only 797 in operation.

Coke Production, 1914.

| Province. | Coal charged to ovens. | Output of coke. | STOCK ON HAND. | | Coke sold or used. | Per cent of total prod. | Value. of sales, etc. |
|-----------------------|------------------------------|-----------------------|----------------|----------|--------------------------|-------------------------------|-----------------------------|
| | | | Jan. 1. | Dec. 31. | | | |
| | Tons. | Tons. | Tons. | Tons. | Tons. | % | \$ |
| Nova Scotia..... | 595,868 | 345,880 | 3,386 | 5,877 | 343,289 | 33·53 | 1,118,614 |
| Ontario..... | (a) 503,312 | 377,514 | 11,753 | 2,953 | 386,314 | 37·73 | 1,352,099 |
| Alberta..... | 44,249 | 28,541 | 518 | 0 | 29,059 | 2·84 | 116,236 |
| British Columbia..... | 398,118 | 263,318 | 4,977 | 3,097 | 265,198 | 25·90 | 1,071,565 |
| Total..... | 1,541,547 | 1,015,253 | 20,634 | 12,027 | 1,023,860 | 100·00 | 3,658,514 |

(a) All imported coal.

Coke Production, 1913.

| Province. | Coal charged to ovens. | Output of coke. | STOCK ON HAND. | | Coke sold or used. | Per cent of total prod. | Value. of sales, etc. |
|-----------------------|------------------------|-----------------|----------------|----------|--------------------|-------------------------|-----------------------|
| | | | Jan. 1. | Dec. 31. | | | |
| | Tons. | Tons. | Tons. | Tons. | Tons. | % | \$ |
| Nova Scotia..... | 1,109,629 | 720,526 | 4,898 | 3,386 | 722,038 | 47·17 | 2,352,153 |
| Ontario..... | (a) 549,001 | 411,643 | 19,397 | 11,753 | 419,287 | 27·40 | 1,991,613 |
| Alberta..... | 104,012 | 65,104 | 2,817 | 518 | 67,403 | 4·41 | 269,612 |
| British Columbia..... | 485,271 | 319,860 | 6,814 | 4,903 | 321,771 | 21·02 | 1,306,218 |
| Total..... | 2,247,913 | 1,517,133 | 33,926 | 20,560 | 1,530,499 | 100·00 | 5,919,596 |

(a) All imported coal.

Distribution of Coke Production, 1914.

| | Nova Scotia. | Ontario. | Alberta. | British Columbia. | Total. |
|--|--------------|----------|----------|-------------------|-----------|
| Sold in Canada..... | 4,647 | 595 | 28,984 | 204,231 | 238,457 |
| Sold for export..... | | | | 60,831 | 60,831 |
| Total sales..... | 4,647 | 595 | 28,984 | 265,062 | 299,288 |
| Used by maker in blast furnace or otherwise..... | 338,642 | 385,719 | 75 | 136 | 724,572 |
| Total sold or used..... | 343,289 | 386,314 | 29,059 | 265,198 | 1,023,860 |
| Number of ovens in operation December 31.... | 238 | 55 | 0 | 504 | 797 |
| Number of ovens idle December 31..... | 710 | 155 | 367 | 1,066 | 2,298 |
| Number of ovens building December 31..... | 0 | 0 | 0 | 0 | 0 |

Annual Production of Coke.

| Calendar Year. | Tons. | Value. | Value per ton. | Calendar Year. | Tons. | Value. | Value per ton. |
|----------------|---------|---------|----------------|----------------|-----------|-----------|----------------|
| | | \$ | \$ cts. | | | \$ | \$ cts. |
| 1886..... | 35,396 | 101,940 | 2 88 | 1901..... | 365,531 | 1,228,225 | 3 36 |
| 1887..... | 40,428 | 135,951 | 3 36 | 1902..... | 502,043 | 1,519,185 | 3 03 |
| 1888..... | 45,373 | 134,181 | 2 96 | 1903..... | 561,318 | 1,734,404 | 3 09 |
| 1889..... | 54,539 | 155,043 | 2 84 | 1904..... | 554,083 | 2,032,048 | 3 66 |
| 1890..... | 56,450 | 166,298 | 2 95 | 1905..... | 700,488 | 2,436,211 | 3 48 |
| 1891..... | 57,084 | 175,592 | 3 08 | 1906..... | 782,055 | 2,863,503 | 3 66 |
| 1892..... | 56,135 | 160,249 | 2 85 | 1907..... | 842,003 | 3,583,468 | 4 26 |
| 1893..... | 61,078 | 161,790 | 2 65 | 1908..... | 858,257 | 3,449,361 | 4 02 |
| 1894..... | 58,044 | 148,551 | 2 56 | 1909..... | 862,011 | 3,484,393 | 4 04 |
| 1895..... | 53,356 | 143,047 | 2 68 | 1910..... | 902,715 | 3,462,872 | 3 84 |
| 1896..... | 49,619 | 110,257 | 2 22 | 1911..... | 935,651 | 3,630,410 | 3 88 |
| 1897..... | 60,686 | 176,457 | 2 91 | 1912..... | 1,411,229 | 5,164,331 | 3 66 |
| 1898..... | 87,600 | 286,000 | 3 26 | 1913..... | 1,530,499 | 5,919,596 | 3 87 |
| 1899..... | 100,820 | 350,022 | 3 47 | 1914..... | 1,023,860 | 3,658,514 | 3 55 |
| 1900..... | 157,134 | 649,140 | 4 13 | | | | |

Annual Production of Coke by Provinces.

| Calendar Year. | NOVA SCOTIA. | | ONTARIO. | | BRITISH COLUMBIA. | | ALBERTA. | |
|----------------|--------------|-----------|----------|-----------|-------------------|-----------|----------|---------|
| | Tons. | Value. | Tons. | Value. | Tons. | Value. | Tons. | Value. |
| | | \$ | | \$ | | \$ | | \$ |
| 1897..... | 41,532 | 90,950 | ..... | ..... | 19,154 | 85,507 | ..... | ..... |
| 1898..... | 48,400 | 111,000 | ..... | ..... | 39,200 | 175,000 | ..... | ..... |
| 1899..... | 62,459 | 178,767 | ..... | ..... | 38,361 | 171,255 | ..... | ..... |
| 1900..... | 61,767 | 223,395 | ..... | ..... | 95,367 | 425,745 | ..... | ..... |
| 1901..... | 222,694 | 590,560 | ..... | ..... | 142,837 | 637,665 | ..... | ..... |
| 1902..... | 363,330 | 899,930 | ..... | ..... | 138,713 | 619,255 | ..... | ..... |
| 1903..... | 371,745 | 888,094 | ..... | ..... | 189,573 | 846,310 | ..... | ..... |
| 1904..... | 275,927 | 808,022 | ..... | ..... | 257,172 | 1,148,090 | 20,984 | 78,936 |
| 1905..... | 386,366 | 1,054,712 | ..... | ..... | 269,256 | 1,202,035 | 44,866 | 179,464 |
| 1906..... | 476,364 | 1,540,976 | ..... | ..... | 236,205 | 1,054,485 | 69,486 | 268,042 |
| 1907..... | 524,110 | 1,688,070 | ..... | ..... | 241,572 | 1,049,432 | 76,321 | 297,595 |
| 1908..... | 505,929 | 1,658,151 | ..... | ..... | 276,683 | 1,482,191 | 75,645 | 309,019 |
| 1909..... | 492,992 | 1,608,092 | ..... | ..... | 281,786 | 1,509,567 | 87,233 | 366,734 |
| 1910..... | 508,058 | 1,655,775 | 24,685 | 148,110 | 248,394 | 1,172,675 | 121,578 | 486,312 |
| 1911..... | 557,554 | 1,814,977 | 259,554 | 1,318,303 | 82,327 | 350,879 | 36,216 | 146,251 |
| 1912..... | 625,918 | 1,840,129 | 379,854 | 1,709,343 | 299,773 | 1,190,832 | 105,684 | 424,027 |
| 1913..... | 722,038 | 2,352,153 | 419,287 | 1,991,613 | 321,771 | 1,306,218 | 67,403 | 269,612 |
| 1914..... | 343,289 | 1,118,614 | 386,314 | 1,352,099 | 265,198 | 1,071,565 | 29,059 | 116,236 |

Annual Exports of Coke.

| Calendar Year. | Tons. | Value. | Calendar Year. | Tons. | Value. |
|----------------|---------|---------|----------------|--------|---------|
| | | \$ | | | \$ |
| 1897..... | 2,987 | 6,078 | 1906..... | 37,003 | 168,571 |
| 1898..... | 3,774 | 8,394 | 1907..... | 70,617 | 320,357 |
| 1899..... | 5,557 | 18,726 | 1908..... | 58,708 | 248,759 |
| 1900..... | 41,529 | 131,278 | 1909..... | 74,067 | 329,051 |
| 1901..... | 57,505 | 176,990 | 1910..... | 57,971 | 250,715 |
| 1902..... | 62,568 | 180,920 | 1911..... | 9,852 | 39,823 |
| 1903..... | 32,608 | 135,957 | 1912..... | 57,744 | 252,763 |
| 1904..... | 102,463 | 345,031 | 1913..... | 68,235 | 308,410 |
| 1905..... | 116,071 | 509,908 | 1914..... | 67,838 | 306,117 |

Annual Imports of Oven Coke.

| Fiscal Year. | Tons. | Value. | Fiscal Year. | Tons. | Value. |
|--------------|--------|---------|--------------|---------|-----------|
| | | \$ | | | \$ |
| 1880..... | 3,837 | 19,353 | 1898..... | 135,060 | 347,040 |
| 1881..... | 5,492 | 26,123 | 1899..... | 141,284 | 362,826 |
| 1882..... | 8,157 | 36,670 | 1900..... | 187,878 | 506,839 |
| 1883..... | 8,943 | 38,588 | 1901..... | 308,786 | 680,138 |
| 1884..... | 11,207 | 44,518 | 1902..... | 267,142 | 842,815 |
| 1885..... | 11,564 | 41,391 | 1903..... | 256,723 | 1,222,756 |
| 1886..... | 11,858 | 39,756 | 1904..... | 221,050 | 765,123 |
| 1887..... | 15,110 | 56,222 | 1905..... | 371,593 | 807,842 |
| 1888..... | 25,487 | 102,334 | 1906..... | 480,222 | 1,311,375 |
| 1889..... | 29,557 | 91,902 | 1907*..... | 400,536 | 1,132,680 |
| 1890..... | 36,564 | 133,344 | 1908..... | 619,269 | 2,166,036 |
| 1891..... | 38,533 | 177,605 | 1909..... | 466,292 | 1,136,624 |
| 1892..... | 43,499 | 194,429 | 1910..... | 702,053 | 1,695,603 |
| 1893..... | 41,821 | 156,277 | 1911..... | 763,114 | 1,887,493 |
| 1894..... | 42,864 | 176,996 | 1912..... | 641,903 | 1,637,091 |
| 1895..... | 43,235 | 140,434 | 1913..... | 710,109 | 2,023,253 |
| 1896..... | 61,612 | 203,826 | 1914†..... | 708,777 | 2,060,914 |
| 1897..... | 83,330 | 267,540 | | | |

*For nine months only. †Duty free.

In Nova Scotia the Stellarton and Londonderry plants were idle throughout the year, but coke was made at Sydney, Sydney Mines, and Westville.

In Ontario, the Atikokan Iron Company's plant at Port Arthur was idle throughout the year. The whole production of the Province came, therefore, from the Algoma Steel Corporation's plant at Sault Ste. Marie.

In Alberta, the plants at Lille and Passburg were idle, and one at Coleman was in operation part of the year.

In British Columbia, coke was made by the Crowsnest Pass Coal Company at Fernie and Michel, and by Hosmer Mines, Limited, at Hosmer.

The coke production of the eastern provinces is used almost entirely in the iron and steel industry, while that of the western provinces is used chiefly by the copper and lead smelters, finding a market in the United States as well as in Canada.

In Nova Scotia at the close of 1914 there were 238 ovens in operation and 710 idle. The Dominion Iron and Steel Company had only 208 of its 620 ovens in operation. All these ovens are of the Otto-Hoffman by-product type, from which are recovered tar, sulphate of ammonia, and gas. The gas is used in the Company's steel plant operations, and the sulphate of ammonia in the crystallized state is disposed of to the trade. The crude tar is sold to the Dominion Tar and Chemical Company, who have a plant close at hand for the separation of a variety of coal-tar products. The Nova Scotia Steel and Coal Company's Bernard ovens were idle at the close of the year, but its 30 Bauer ovens were in operation. The surplus gas from the Baur ovens is used in generating steam for general colliery use, while that from the Bernard ovens is used for the production of steam for the power generating plant. All other ovens in the Province were idle at the end of the year.

In Ontario, the Atikokan Iron Company's 100 Beehive ovens at Port Arthur were idle throughout the year, but the Algoma Steel Company's 110 Koppers Regenerative By-product ovens at Sault Ste. Marie were in operation most of the year, though 55 were idle on December 31. At the Sault Ste. Marie plant, crude tar, crystallized sulphate of ammonia, and gas, are recovered. The tar is sold to the Dominion Tar and Chemical Company, who have a plant close at hand for the separation of coal-tar products. The sulphate of ammonia is sold in the open market and the surplus gas is used in the Company's steel plant operations.

In Alberta, all of the Western Canadian Collieries' 50 Bernard ovens at Lille, all of the Leitch Collieries' 101 Mitchell rectangular ovens at Passburg, and some of the International Coal and Coke Company's 216 Beehive ovens at Coleman, were idle throughout the year. There were none in operation on December 31.

In British Columbia too, the coke trade was adversely affected though not to the same extent as in Alberta and Nova Scotia. At the end of the

year the Crowsnest Pass Coal Company had 50 of its 454 Beehive ovens at Fernie idle, and 386 of its 486 at Michel idle; its 240 Beehive ovens at Carbonado have been idle for some years. The 240 Beehive ovens of Hosmer Mines, Limited, at Hosmer, were idle throughout the year, as were also those of the Canadian Collieries (Dunsmuir) Limited, at Comox, on Vancouver island.

The exports for 1914 were 67,838 tons, all from British Columbia. This was a slight decrease from 1913 when the exports were 68,235 tons.

Coke Oven By-products.

As in 1913, coke oven by-products were recovered only at Sydney, N.S., and Sault Ste. Marie, Ontario. The 1914 recoveries were as follows: 5,714,172 gallons tar and 8,572 tons of sulphate of ammonia. In 1913 the recoveries were 8,371,600 gallons of tar, and 10,608 tons of sulphate of ammonia.

Annual Production of Coke Oven By-products.

| Year. | Tar. | Sulphate of ammonia. | Year. | Tar. | Sulphate. of ammonia. |
|-----------|-----------|----------------------------|-----------|-----------|-----------------------------|
| | Gals. | Tons of 2,000 lbs. | | Gals. | Tons of 2,000 lbs. |
| 1901..... | 2,662,612 | 1,614 | 1908..... | 4,450,166 | 3,342 |
| 1902..... | 4,094,135 | 2,393 | 1909..... | 4,016,824 | 3,416 |
| 1903..... | 3,281,249 | 3,207 | 1910..... | 3,963,591 | 3,491 |
| 1904..... | 1,649,197 | 1,773 | 1911..... | 6,464,155 | 7,124 |
| 1905..... | 3,407,784 | 2,500 | 1912..... | 8,428,896 | 11,289 |
| 1906..... | 3,725,723 | 2,364 | 1913..... | 8,371,600 | 10,608 |
| 1907..... | 4,424,615 | 1,738 | 1914..... | 5,714,172 | 8,572 |

FELDSPAR.

The 1914 production of feldspar was the largest on record being 18,060 tons valued at \$70,824, or an average of \$3.92 per ton. The 1913 production was 16,790 tons valued at \$60,795 or an average of \$3.62 per ton, and the 1912 production was 13,733 tons valued at \$30,916 or an average of \$2.25 per ton.

Almost all the feldspar shipped from Canadian mines goes to United States consumers, the 1914 exports being 18,072 tons valued at \$74,100, or an average of \$4.10 per ton.

Statistics of production and exports of feldspar are given in the following table:—

Production and Exports of Feldspar.

| Calendar Year. | PRODUCTION. | | | EXPORTS. | | |
|----------------|-------------|--------------|----------|----------|--------------|----------|
| | Tons. | Value. \$ | Average. | Tons. | Value. \$ | Average. |
| 1890..... | 700 | 3,500 | 5 00 | ..... | ..... | ..... |
| 1891..... | 685 | 3,425 | 5 00 | ..... | ..... | ..... |
| 1892..... | 175 | 525 | 3 00 | ..... | ..... | ..... |
| 1893..... | 575 | 4,525 | 7 87 | ..... | ..... | ..... |
| 1894..... | Nil. | Nil. | ..... | 50 | 500 | 10 00 |
| 1895..... | ..... | *2,545 | ..... | Nil. | Nil. | ..... |
| 1896..... | 972 | *2,583 | 2 66 | ..... | 2,545 | ..... |
| 1897..... | 1,400 | 3,290 | 2 35 | 972 | 2,583 | 2 66 |
| 1898..... | 2,500 | 6,250 | 2 50 | 3,078 | 5,637 | 1 83 |
| 1899..... | 3,000 | 6,000 | 2 00 | 1,542 | 4,396 | 2 85 |
| 1900..... | 318 | 1,112 | 3 50 | 1,757 | 5,126 | 2 92 |
| 1901..... | 5,350 | 10,700 | 2 00 | 379 | 1,116 | 2 94 |
| 1902..... | 7,576 | 15,152 | 2 00 | 4,367 | 10,973 | 2 51 |
| 1903..... | 13,928 | 18,966 | 1 36 | 7,374 | 13,708 | 1 86 |
| 1904..... | 11,083 | 22,166 | 2 00 | 13,760 | 23,319 | 1 69 |
| 1905..... | 11,700 | 23,400 | 2 00 | 13,960 | 29,263 | 2 10 |
| 1906..... | 16,948 | 40,890 | 2 41 | 9,161 | 27,660 | 3 02 |
| 1907..... | 12,584 | 29,819 | 2 37 | 18,183 | 60,312 | 3 32 |
| 1908..... | 7,877 | 21,099 | 2 68 | 12,068 | 37,932 | 3 14 |
| 1909..... | 12,783 | 40,383 | 3 16 | 9,524 | 34,045 | 3 57 |
| 1910..... | 15,809 | 47,667 | 3 02 | 10,834 | 35,234 | 3 25 |
| 1911..... | 17,723 | 51,939 | 2 93 | 15,601 | 47,962 | 3 07 |
| 1912..... | 13,733 | 30,916 | 2 25 | 16,150 | 56,085 | 3 47 |
| 1913..... | 16,790 | 60,795 | 3 62 | 12,779 | 44,114 | 3 45 |
| 1914..... | 18,060 | 70,824 | 3 92 | 15,966 | 62,767 | 3 93 |
| | | | | 18,072 | 74,100 | 4 10 |

*Exports.

The Canadian production of feldspar comes chiefly from the counties of Frontenac and Lanark in Ontario. A small proportion comes from the Villeneuve mine, Township of Villeneuve, Labelle county, Quebec, where an exceptionally pure white feldspar, suitable for the manufacture of artificial teeth, is mined. Deposits in Ottawa county, Quebec, have been operated in past years to some extent; but they are now idle. At Manicouagan Bay, on the north shore of the River St. Lawrence, there has been some development work done, but no production of feldspar has been yet reported.

In Ontario there are small deposits in Muskoka and Parry Sound districts, on which a little work has been done.

The shipping firms in 1914 were: The Kingston Feldspar Mining Company, Kingston, operating the Richardson and Reynolds mines, Frontenac county, Ontario. The Dominion Feldspar Company, Limited, 30 Adelaide W., Toronto, operating quarries near Bobs Lake, Frontenac county, Quebec. The Dominion Improvement and Development Company, P. O. Box 26, Perth, Ontario, operating a quarry in North Burgess township, Lanark county, Ontario. Messrs. O'Brien and Fowler, Beech street, Ottawa, Canada, operating Villeneuve mine, Villeneuve township, Labelle county, Quebec.

FLUORSPAR.

In 1914 as in 1913, there were no shipments of fluorspar.

Several occurrences of fluorspar are known near Madoc, in Huntingdon and Madoc townships, in Hastings county, Ontario. In 1905 Mr. Stephen Wellington opened a deposit on Lot 1, Con. IV, Madoc township, and made a shipment of 12 tons to Port Hope, Ontario. In 1910 Messrs. Gillespie and Wellington mined from a deposit on Lot 10, Con. XIV, of the Township of Huntingdon, about 200 tons of material from which 2 tons of fluorspar valued at \$15 were shipped. Additional work in succeeding years resulted in shipments in 1911 of 34 tons, valued at \$238, to the smelter at Deloro and to steel foundries at Welland, and in 1912 of 40 tons, valued at \$240 to the Copper Cliff smelter. This property is known as the Rogers Fluorspar mine. It is now owned by Messrs. Cross and Wellington, Madoc, Ontario. Other occurrences of fluorspar have been noted on Lots 11 and 12, Con. XIII, Huntingdon township, and on Lot 2, Con. III, Madoc township.

Imports of fluorspar cannot be stated accurately as they are not shown separately in the Reports of the Customs Department. The consumption in steel works though is considerable and reports from steel companies covering their operations show the consumption from 1910 to 1914 inclusive to have been respectively: 7,461 tons, 8,067 tons, 9,709 tons, 10,687 tons, and 7,842 tons.

Imports of hydrofluosilicic acid used in the lead refinery at Trail, B. C., during recent years have been as follows:—

Imports of Hydrofluosilicic Acid.

| | Pounds | \$ |
|--------------------------|-----------|--------|
| Calendar year, 1910..... | 187,785 | 10,813 |
| " 1911..... | 223,706 | 9,173 |
| " 1912..... | 302,918 | 24,891 |
| " 1913..... | 1,182,293 | 46,517 |
| " 1914..... | 1,384,087 | 41,576 |

GRAPHITE.

In 1914, milled or refined graphite only was shipped by Canadian producers, the total shipments amounting to 1,647 tons, valued at \$107,203, or an average of \$65.10 per ton. The 1913 production of refined graphite was 1,762 tons valued at \$87,882 or an average of \$49.88 per ton, and in 1912 it was 1,850 tons, valued at \$115,757, or an average of \$62.57 per ton. The shipments of crude in 1913 were 400 tons valued at \$2,400, and in 1912 they were 210 tons valued at \$1,365.

The value of the 1914 shipments showed an increase of 18.74 per cent over the value of the 1913 shipments, and is the second largest recorded.

The following table gives statistics of annual production since 1886.

Annual Production of Graphite.

| Calendar Year. | Tons. | Value. | Calendar Year. | Tons. | Value. |
|----------------|-------|--------|----------------|-------|---------|
| | | \$ | | | \$ |
| 1886..... | 500 | 4,000 | 1900..... | 1,922 | 31,040 |
| 1887..... | 300 | 2,400 | 1901..... | 2,210 | 38,780 |
| 1888..... | 150 | 1,200 | 1902..... | 1,095 | 28,300 |
| 1889..... | 242 | 3,160 | 1903..... | 728 | 23,745 |
| 1890..... | 175 | 5,200 | 1904..... | 452 | 11,760 |
| 1891..... | 260 | 1,560 | 1905..... | 541 | 16,735 |
| 1892..... | 167 | 3,763 | 1906..... | 387 | 18,300 |
| 1893..... | Nil. | Nil. | 1907..... | 579 | 16,000 |
| 1894*..... | 3 | 223 | 1908..... | 251½ | 5,565 |
| 1895..... | 220 | 6,150 | 1909..... | 864 | 47,800 |
| 1896..... | 139 | 9,455 | 1910..... | 1,392 | 74,087 |
| 1897..... | 436 | 16,240 | 1911..... | 1,269 | 69,576 |
| 1898..... | ..... | 13,698 | 1912..... | 2,060 | 117,122 |
| 1899..... | 1,130 | 24,179 | 1913..... | 2,162 | 90,282 |
| | | | 1914..... | 1,647 | 107,203 |

*Exports.

In 1914, mills in the Buckingham district of Quebec shipped 261 tons, valued at \$18,886, and mills at Harcourt, Wilberforce, and Calabogie, Ontario, made shipments aggregating 1,386 tons, valued at \$88,317. In 1913, the Quebec shipments were 103 tons valued at \$9,620, and the Ontario shipments 2,059 tons valued at \$80,662, and in 1912 the shipments from Quebec were 604 tons, and from Ontario 1,456 tons.

Exports of graphite are classified as crude ore and concentrates, and manufactures of plumbago. In 1914 the value of these exported was \$123,246 which is the second highest year's exportation on record. During the last six years the tonnage of crude and refined graphite exported is

equivalent to 72·5 per cent of the production during the same period. Statistics of the exports of graphite follow:—

Exports of Graphite.

| Year. | CRUDE ORE AND CONCENTRATES. | | MANU-FACTURES. | Total value. |
|-----------|-----------------------------|--------|----------------|--------------|
| | Tons. | Value. | Value. | |
| | | \$ | \$ | \$ |
| 1886..... | | | | 3,586 |
| 1887..... | | | | 3,017 |
| 1888..... | | | | 1,080 |
| 1889..... | | | | 538 |
| 1890..... | | | | 1,529 |
| 1891..... | | | | 72 |
| 1892..... | | | | 3,952 |
| 1893..... | 1 | 38 | 10 | 48 |
| 1894..... | 3 | 223 | | 223 |
| 1895..... | 544 | 4,803 | 30 | 4,833 |
| 1896..... | 136 | 9,126 | 354 | 9,480 |
| 1897..... | 205 | 2,988 | 1,337 | 4,325 |
| 1898..... | 591 | 11,527 | 1,571 | 13,098 |
| 1899..... | 1,237 | 19,326 | 3,164 | 22,490 |
| 1900..... | 1,550 | 40,132 | 6,065 | 46,197 |
| 1901..... | 1,194 | 30,535 | 4,567 | 35,102 |
| 1902..... | 886 | 23,097 | 1,742 | 24,839 |
| 1903..... | 412 | 26,230 | 17,412 | 43,642 |
| 1904..... | 177 | 9,609 | 6,958 | 16,567 |
| 1905..... | 254 | 7,596 | 518 | 8,114 |
| 1906..... | 106 | 2,468 | 5,274 | 7,742 |
| 1907..... | 121 | 3,036 | 2,847 | 5,883 |
| 1908..... | 385 | 10,158 | 876 | 11,034 |
| 1909..... | 1,004 | 52,438 | 864 | 53,302 |
| 1910..... | 788 | 53,008 | 66,658 | 119,666 |
| 1911..... | 813 | 43,249 | 33,956 | 77,205 |
| 1912..... | 1,654 | 70,763 | 58,920 | 129,683 |
| 1913..... | 1,642 | 85,368 | 24,284 | 109,652 |
| 1914..... | 919 | 50,528 | 72,718 | 123,246 |

An analysis of the exports of recent years showing destinations is given in the following table:—

Exports of Graphite by Countries.

| Calen- dar Year. | CRUDE ORE AND CONCENTRATES. | | | | | | MANUFACTURES OF PLUMBAGO. | | |
|------------------------|-----------------------------|--------|----------------|--------|------------------|--------|---------------------------|----------------|------------------|
| | Great Britain. | | United States. | | Other Countries. | | Great Britain. | United States. | Other Countries. |
| | Tons. | Value. | Tons. | Value. | Tons. | Value. | Value. | Value. | Value. |
| | | \$ | | \$ | | \$ | \$ | \$ | \$ |
| 1909... | 83 | 9,035 | 905 | 41,558 | 16 | 1,845 | | | |
| 1910... | 223 | 16,453 | 556 | 35,555 | 9 | 1,000 | 3,051 | 63,466 | 141 |
| 1911... | 30 | 3,631 | 752 | 36,295 | 31 | 3,323 | 2,289 | 30,062 | 1,605 |
| 1912... | 59 | 4,984 | 1,550 | 62,680 | 45 | 3,099 | 3,932 | 46,796 | 8,192 |
| 1913... | 19 | 1,700 | 1,618 | 82,758 | 5 | 910 | 3,278 | 20,279 | 727 |
| 1914... | 77 | 6,730 | 814 | 41,168 | 28 | 2,630 | 12,051 | 58,816 | 1,851 |

An examination of the above table shows the tonnage of graphite exported during the past six years to have been distributed as follows: To

Great Britain, 7.2 per cent; to United States 90.8 per cent, and to other countries 2.0 per cent. Of manufactures of plumbago valued at \$256,536, Great Britain took 9.6 per cent; United States 85.5 per cent, and other countries 4.9 per cent.

Statistics of imports of graphite are given in the next table. The imports for the calendar year 1914 were valued at \$100,192, and comprised: plumbago, not ground \$801; black lead \$6,798, plumbago, ground and manufactures \$42,680, and crucibles of clay or plumbago \$49,913.

Imports of Raw and Manufactured Graphite.

| Fiscal Year. | Plumbago not ground. | Black lead. | Ground and manufactures. | Crucibles, clay or plumbago. | Total. |
|--------------------|-------------------------|-------------|-----------------------------|------------------------------------|---------|
| | \$ | \$ | \$ | \$ | \$ |
| 1880..... | 1,677 | 18,055 | 2,738 | | 22,470 |
| 1881..... | 2,479 | 26,544 | 1,202 | | 30,225 |
| 1882..... | 1,028 | 25,132 | 2,181 | | 28,341 |
| 1883..... | 3,147 | 21,151 | 2,141 | | 26,439 |
| 1884..... | 2,891 | 24,002 | 2,152 | | 29,045 |
| 1885..... | 3,729 | 24,487 | 2,805 | | 31,021 |
| 1886..... | 5,522 | 23,211 | 1,408 | | 30,141 |
| 1887..... | 4,020 | 25,766 | 2,830 | | 32,616 |
| 1888..... | 3,802 | 7,824 | 22,604 | | 34,230 |
| 1889..... | 3,546 | 11,852 | 21,789 | | 37,187 |
| 1890..... | 3,441 | 10,276 | 26,605 | | 40,322 |
| 1891..... | 7,217 | 8,292 | 26,201 | | 41,710 |
| 1892..... | 2,988 | 13,560 | 23,085 | | 39,633 |
| 1893..... | 3,293 | 16,595 | 23,051 | | 42,939 |
| 1894..... | 2,177 | 17,614 | 15,196 | 1,490 | 36,477 |
| 1895..... | 2,586 | 13,922 | 16,361 | 5,627 | 38,496 |
| 1896..... | 2,865 | 18,434 | 12,090 | 7,407 | 40,796 |
| 1897..... | 1,406 | 17,863 | 14,768 | 5,906 | 39,943 |
| 1898..... | 1,862 | 19,638 | 20,120 | 12,533 | 54,153 |
| 1899..... | 4,979 | 21,334 | 22,140 | 14,350 | 62,803 |
| 1900..... | 4,437 | 22,078 | 17,869 | 20,571 | 64,955 |
| 1901..... | 2,357 | 25,646 | 11,016 | 38,874 | 77,893 |
| 1902..... | 3,649 | 20,467 | 15,021 | 28,635 | 67,772 |
| 1903..... | 2,870 | 22,559 | 12,493 | 34,624 | 72,546 |
| 1904..... | 1,802 | 26,053 | 12,737 | 28,773 | 69,365 |
| 1905..... | 2,499 | 30,743 | 13,192 | 31,353 | 77,787 |
| 1906..... | 2,791 | 33,907 | 19,058 | 32,950 | 88,706 |
| 1907 (9 mos.)..... | 3,176 | 16,646 | 13,740 | 27,271 | 60,833 |
| 1908..... | 3,030 | 9,042 | 31,428 | 40,092 | 83,592 |
| 1909..... | 1,408 | 11,009 | 26,918 | 37,213 | 76,548 |
| Calendar Year. | | | | | |
| 1910..... | 4,867 | 10,048 | 45,042 | 52,896 | 112,853 |
| 1911..... | 4,940 | 14,172 | 37,020 | 56,814 | 112,946 |
| 1912..... | 7,249 | 9,587 | 56,324 | 82,324 | 155,484 |
| 1913..... | 9,375 | 8,633 | 64,254 | 73,971 | 156,233 |
| 1914..... | 801 | 6,798 | 42,680 | 49,913 | 100,192 |

The market for graphite in Great Britain is to some extent indicated by the imports into that country, which for 1913 and 1914 were as follows:—

Imports of Plumbago into Great Britain 1913 and 1914.

| | 1913. | | | 1914. | | |
|--------------------------------|------------------|-----------|----------|-------------------|-----------|----------|
| | Tons (short). | Value. | Per ton. | Tons. (short). | Value. | Per ton. |
| | | \$ | \$ cts. | | \$ | \$ cts. |
| Germany..... | 3,376 | 133,196 | 39 50 | 1,590 | 64,941 | 40 84 |
| France..... | 199 | 10,541 | 52 90 | 225 | 13,393 | 59 52 |
| Madagascar..... | 4,519 | 449,578 | 99 50 | 4,932 | 460,362 | 93 34 |
| Italy..... | 1,400 | 26,942 | 19 20 | 1,258 | 24,844 | 19 75 |
| Austria-Hungary..... | 502 | 11,500 | 22 90 | 96 | 3,669 | 38 22 |
| Japan..... | 4,324 | 131,006 | 31 30 | 4,667 | 142,000 | 30 43 |
| United States..... | 421 | 36,495 | 86 69 | 431 | 33,994 | 78 87 |
| Other foreign countries..... | 1,016 | 36,315 | 35 74 | 282 | 9,174 | 32 53 |
| British India..... | 539 | 31,482 | 58 41 | | | |
| Ceylon and dependencies..... | 6,707 | 793,816 | 118 36 | 2,938 | 277,818 | 94 56 |
| Australia..... | 88 | 1,801 | 20 46 | | | |
| Canada..... | 64 | 5,840 | 91 25 | 187 | 14,172 | 75 79 |
| Other British possessions..... | | | | 2 | 146 | 73 00 |
| Total..... | 23,155 | 1,668,512 | 72 06 | 16,608 | 1,044,513 | 62 89 |

¹ British Trade Report.

Prices of refined graphite in London, England, as quoted by the Mining Journal, for the last week of the calendar years 1909, 1910, 1911, 1912, 1913, and 1914 have remained constant at the following figures:—

Graphite Purified, Milled and Ground.

| | |
|---------------------------|-----------------------------------|
| Ceylon, 97 to 99 per cent | £59 to £63 per ton f.o.b. London. |
| “ 90 to 91 “ | 40 to 42 “ “ “ |
| “ 80 to 81 “ | 30 to 32 “ “ “ |
| “ 70 to 71 “ | 27 to 28 “ “ “ |
| American, large flake, | 45 to 49 “ “ “ |
| “ small “ | 35 to 45 “ “ “ |

The following is a list of the principal firms operating graphite properties in recent years.

| Operator and address. | LOCATION. | | | Mine office. |
|---|---------------|---------------|---|---------------------------------|
| | County. | Township. | Range or concession and lot. | |
| Quebec. | | | | |
| The Canadian Graphite Co., Ltd., Montreal, 34 Coristine Building. | Argenteuil... | Wentworth.. | III, 1A, 1B..... | Lachute. |
| *Graphite Limited, Montreal, 811 Mullin St | Labelle | Amherst..... | VI, VII, 16..... | St. Remi d'Amherst. Buckingham. |
| *The Quebec Graphite Co., Ltd., Buckingham. | " | Buckingham. | IV, 1, 2, 3, $\frac{1}{2}$ 4, $\frac{1}{2}$ 5.... | Buckingham. |
| Buckingham Graphite Co., Ltd., Buckingham. | " | Lochaber..... | IV, 28..... | " |
| The Bell Graphite Co., Ltd., Friars House, London, Eng. | " | " | V, 1, 2, 3..... | " |
| Dominion Graphite Co., Toronto, 15 Wellington St. W. | " | " | V, 20..... | In liquidation. |
| Peerless Graphite Co., 32 Thorndale Terrace, Rochester, N.Y. | " | " | IX, X, 12, 13..... | Buckingham. |
| Ontario. | | | | |
| *Black Donald Graphite Co., Calabogie.... | Renfrew..... | Brougham... | III, IV, near Whitefish Lake. | Calabogie. |
| The Globe Refining Co., 32 Adelaide E., Toronto. | Lanark..... | Elmsley N... | VI, 23..... | Port Elmsley. |
| " | " | Burgess N... | V, 21, VI, 22..... | " |
| *Tonkin-du-Pont Graphite Co., Ltd., Wilberforce..... | Hastings... | Monteagle... | XIII, 23..... | Maynooth. |
| Matthews and Foster, 18 Toronto St., Toronto..... | Haliburton .. | Monmouth... | XVI, S $\frac{1}{2}$ 35..... | Wilberforce. |
| " | Hastings... | Monteagle... | XIII, 24..... | Maynooth. |
| *New York Graphite Co., Harcourt..... | Haliburton .. | Cardiff..... | XXII, 9, 10, 11.... | Harcourt. |

* Operating in 1914.

ARTIFICIAL GRAPHITE.

Artificial graphite has been manufactured in electric furnaces at Niagara Falls, Ontario, for several years by the International Acheson Graphite Company. The production has been as follows:—

| <i>Calendar year.</i> | <i>Quantity.</i> |
|-----------------------|------------------|
| 1906..... | 445,047 pounds. |
| 1907..... | 407,779 " |
| 1908..... | 428,540 " |
| 1909..... | 513,436 " |
| 1910..... | 2,442,166 " |
| 1911..... | 2,172,098 " |
| 1912..... | 2,302,625 " |
| 1913..... | 2,184,472 " |
| 1914..... | 1,234,231 " |

GYPSUM.

A report¹ on the gypsum industry in Canada has lately been issued by the Mines Branch of the Department of Mines, Ottawa. This describes in detail the operating deposits in the different provinces, and the methods of treatment followed in preparing gypsum for the market.

The provinces producing gypsum are: Nova Scotia, New Brunswick, Ontario, Manitoba, and British Columbia. Since 1886 the total production from these provinces has been as follows: Nova Scotia, 6,279,802 tons; New Brunswick, 2,449,157 tons; Ontario, 339,457 tons; Manitoba, 266,037 tons; and British Columbia, 980 tons. Manitoba's first shipments were made in 1901, and British Columbia has made shipments in 1911 and 1913 only. In Manitoba the industry is comparatively young, but it has made rapid strides. In British Columbia the industry is in its infancy.

The total shipments of gypsum products of all varieties in 1914 were 516,880 tons valued at \$1,156,207, as compared with 636,370 tons in 1913 valued at \$1,447,739, and 578,458 tons in 1912 valued at \$1,324,620.

In 1914 the total quantity of crude gypsum mined was 579,841 tons as compared with 684,726 tons in 1913, and 549,856 tons in 1912. The quantity calcined in 1914 was reported as 138,212 tons, as compared with 147,532 tons in 1913, and 133,392 tons in 1912. The total shipments in 1914 included 351,729 tons of "lump" valued at \$400,521, or an average of \$1.14 per ton, 49,441 tons of "crushed" valued at \$61,686, or an average of \$1.25 per ton; 6,097 tons of "fine-ground" valued at \$14,496, or an average of \$2.38 per ton, and 109,613 tons of "calcined" valued at \$679,504 or an average of \$6.20 per ton. In 1913 the shipments were classified as follows:—"Crude" 499,460 tons valued at \$615,493, or an average of \$1.23 per ton; "ground" 10,281 tons valued at \$20,576 or an average of \$2.00 per ton, and "calcined" 126,629 tons valued at \$811,670, or an average of \$6.41 per ton.

The total quantity of gypsum mined and the total quantity calcined during the past ten years is shown in the following table:—

Gypsum Mined and Gypsum Calcined.

(Short Tons.)

| Year. | Total gypsum mined. | Gypsum calcined. | Year. | Total gypsum mined. | Gypsum calcined. |
|-----------|---------------------|------------------|-----------|---------------------|------------------|
| | Tons. | Tons. | | Tons. | Tons. |
| 1905..... | 443,569 | 26,855 | 1910..... | 548,019 | 69,889 |
| 1906..... | 492,759 | 28,831 | 1911..... | 515,979 | 76,718 |
| 1907..... | 489,962 | 34,752 | 1912..... | 549,856 | 133,392 |
| 1908..... | 375,444 | 48,727 | 1913..... | 684,726 | 147,532 |
| 1909..... | 493,068 | 63,670 | 1914..... | 579,841 | 138,212 |

¹ Gypsum in Canada: Its Occurrence, Exploitation, and Technology, L. H. Cole, Mines Branch, Dept. of Mines, Ottawa, Canada, 1915, No. 245.

Over 60 per cent of the gypsum mined in 1914 was shipped in lump form as quarried, and of this over 90 per cent went to calcining mills in the United States. Almost all of the shipments of crude lump are made from the Maritime provinces from which cheap transportation by water is easily secured. There was calcined 138,212 tons, or 23.8 per cent of the tonnage mined. There was shipped as crushed, and fine ground, 55,538 tons or 9.4 per cent of the tonnage mined. The balance mined was probably represented in stock accumulated at the end of the year.

For the 1914 production of gypsum and gypsum products a modification of the classification of recent years has been adopted. Consequently these figures appear by themselves. Statistics of the shipments of crude and calcined gypsum from 1905-1913, and of the annual production of gypsum products since 1886, are shown in the tables following:—

Shipments of Crude and Calcined Gypsum, 1914.

| Grade. | Tons. | Value. | Average per ton. |
|------------------|---------|-----------|---------------------|
| | | \$ | \$ cts. |
| Lump..... | 351,729 | 400,521 | 1 14 |
| Crushed..... | 49,441 | 61,686 | 1 25 |
| Fine ground..... | 6,079 | 14,496 | 2 38 |
| Calcined..... | 109,603 | 679,504 | 6 20 |
| Total..... | 516,880 | 1,156,207 | 2 24 |

Shipments of Crude and Calcined Gypsum, 1905-1913.

| Calen- dar Year. | CRUDE (LUMP). | | | CRUDE (GROUND). | | | CALCINED. | | |
|------------------------|---------------|---------|----------|-----------------|--------|----------|-----------|---------|----------|
| | Tons. | Value. | Per ton. | Tons. | Value. | Per ton. | Tons. | Value. | Per ton. |
| | | \$ | \$ cts. | | \$ | \$ cts. | | \$ | \$ cts. |
| 1905... | 412,155 | 409,146 | 0 99 | 3,255 | 8,779 | 2 70 | 26,748 | 168,243 | 6 29 |
| 1906... | 442,132 | 473,960 | 1 07 | 3,195 | 9,823 | 3 07 | 23,695 | 159,511 | 6 73 |
| 1907... | 454,668 | 473,831 | 1 04 | 6,732 | 16,268 | 2 42 | 24,521 | 156,815 | 6 40 |
| 1908... | 298,188 | 307,532 | 1 03 | 9,504 | 25,468 | 2 68 | 33,272 | 242,701 | 7 29 |
| 1909... | 423,474 | 457,038 | 1 08 | 8,814 | 26,159 | 2 97 | 40,841 | 326,435 | 7 99 |
| 1910... | 469,573 | 508,686 | 1 08 | 6,121 | 17,390 | 2 84 | 49,552 | 408,370 | 8 24 |
| 1911... | 449,823 | 481,077 | 1 07 | 7,149 | 23,125 | 3 23 | 61,411 | 489,192 | 7 97 |
| 1912... | 453,577 | 525,345 | 1 16 | 15,487 | 29,244 | 1 89 | 109,394 | 770,031 | 7 04 |
| 1913... | 499,460 | 615,493 | 1 23 | 10,281 | 20,576 | 2 00 | 126,629 | 811,670 | 6 41 |

Annual Production of Gypsum.

| Calendar Year. | Tons. | Value. | Per ton. | Calendar Year. | Tons. | Value. | Per ton. |
|----------------|---------|---------|----------|----------------|---------|-----------|----------|
| | | \$ | \$ cts. | | | \$ | \$ cts. |
| 1886..... | 162,000 | 178,742 | 1 10 | 1900..... | 252,101 | 259,009 | 1 02 |
| 1887..... | 154,008 | 157,277 | 1 02 | 1901..... | 293,799 | 340,148 | 1 16 |
| 1888..... | 175,887 | 179,393 | 1 01 | 1902..... | 333,599 | 379,479 | 1 14 |
| 1889..... | 213,273 | 205,108 | 0 96 | 1903..... | 314,489 | 388,459 | 1 24 |
| 1890..... | 226,509 | 194,033 | 0 86 | 1904..... | 345,961 | 373,474 | 1 08 |
| 1891..... | 203,605 | 206,251 | 1 01 | 1905..... | 442,158 | 586,168 | 1 32 |
| 1892..... | 241,048 | 241,127 | 1 00 | 1906..... | 469,022 | 643,294 | 1 37 |
| 1893..... | 192,568 | 196,150 | 1 02 | 1907..... | 485,921 | 646,914 | 1 33 |
| 1894..... | 223,631 | 202,031 | 0 90 | 1908..... | 340,964 | 575,701 | 1 69 |
| 1895..... | 226,178 | 202,608 | 0 89 | 1909..... | 473,129 | 809,632 | 1 71 |
| 1896..... | 207,032 | 178,061 | 0 86 | 1910..... | 525,246 | 934,446 | 1 78 |
| 1897..... | 239,691 | 244,531 | 1 02 | 1911..... | 518,383 | 993,394 | 1 92 |
| 1898..... | 219,256 | 232,515 | 1 06 | 1912..... | 578,458 | 1,324,620 | 2 29 |
| 1899..... | 244,566 | 257,329 | 1 05 | 1913..... | 636,370 | 1,447,739 | 2 27 |
| | | | | 1914..... | 516,880 | 1,156,207 | 2 24 |

The production by provinces during 1914 was as follows: Nova Scotia 303,155 tons; Ontario 81,219 tons; New Brunswick 79,083 tons, and Manitoba 53,423 tons. On the basis of value of production the provinces rank as follows: Manitoba \$382,563; Nova Scotia \$368,931; Ontario \$204,033, and New Brunswick \$200,680. The different ranking of the provinces in the two comparisons is largely due to the fact that almost the entire production of Nova Scotia and New Brunswick is shipped as quarried, the Ontario production is composed of goodly proportions of crushed, fine ground and calcined gypsum, and that of Manitoba is practically all calcined.

Annual Production of Gypsum by Provinces.

| Calendar Year. | NOVA SCOTIA. | | NEW BRUNSWICK. | | ONTARIO. | | MANITOBA. | | BRITISH COLUMBIA. | |
|----------------|--------------|---------|----------------|---------|----------|---------|-----------|---------|-------------------|--------|
| | Tons. | Value. | Tons. | Value. | Tons. | Value. | Tons. | Value. | Tons. | Value. |
| | | \$ | | \$ | | \$ | | \$ | | \$ |
| 1887..... | 116,346 | 116,346 | 29,102 | 29,216 | 8,560 | 11,715 | | | | |
| 1888..... | 124,818 | 120,429 | 44,369 | 48,764 | 6,700 | 10,200 | | | | |
| 1889..... | 165,025 | 142,850 | 40,866 | 49,130 | 7,382 | 13,128 | | | | |
| 1890..... | 181,285 | 154,972 | 39,024 | 30,986 | 6,200 | 8,075 | | | | |
| 1891..... | 161,934 | 153,955 | 36,011 | 33,996 | 5,660 | 18,300 | | | | |
| 1892..... | 197,019 | 170,021 | 39,709 | 65,707 | 4,320 | 5,399 | | | | |
| 1893..... | 152,754 | 144,111 | 36,916 | 41,846 | 2,898 | 10,193 | | | | |
| 1894..... | 168,300 | 147,644 | 52,962 | 48,200 | 2,369 | 6,187 | | | | |
| 1895..... | 156,809 | 133,929 | 66,949 | 63,839 | 2,420 | 4,840 | | | | |
| 1896..... | 136,590 | 111,251 | 67,137 | 59,024 | 3,305 | 7,786 | | | | |
| 1897..... | 155,572 | 121,754 | 82,658 | 118,116 | 1,461 | 4,661 | | | | |
| 1898..... | 132,086 | 106,610 | 86,083 | 121,704 | 1,087 | 4,201 | | | | |
| 1899..... | 126,754 | 102,055 | 116,792 | 151,296 | 1,020 | 3,978 | | | | |
| 1900..... | 138,712 | 108,828 | 112,294 | 145,850 | 1,095 | 4,331 | | | | |
| 1901..... | 170,100 | 136,947 | 121,595 | 189,709 | 1,504 | 5,692 | 600 | 7,800 | | |
| 1902..... | 206,087 | 181,425 | 124,041 | 170,153 | 1,917 | 7,699 | 1,554 | 20,202 | | |
| 1903..... | 189,427 | 173,881 | 119,182 | 172,080 | 2,720 | 21,988 | 3,160 | 20,510 | | |
| 1904..... | 218,580 | 153,600 | 190,991 | 187,524 | 2,390 | 18,350 | 4,000 | 14,000 | | |
| 1905..... | 272,252 | 298,248 | 163,553 | 232,586 | 1,853 | 23,834 | 4,500 | 31,500 | | |
| 1906..... | 333,312 | 345,414 | 131,246 | 250,960 | 2,965 | 24,420 | 3,200 | 22,500 | | |
| 1907..... | 357,411 | 380,859 | 118,106 | 213,638 | 10,404 | 52,417 | | | | |
| 1908..... | 234,455 | 230,433 | 81,620 | 191,312 | 10,389 | 42,456 | 14,500 | 111,500 | | |
| 1909..... | 345,682 | 364,379 | 98,716 | 226,975 | 11,731 | 48,278 | 17,000 | 170,000 | | |
| 1910..... | 400,455 | 458,638 | 90,236 | 213,579 | 15,055 | 67,229 | 19,500 | 195,000 | | |
| 1911..... | 353,999 | 406,457 | 93,205 | 115,044 | 27,399 | 98,018 | 43,000 | 372,000 | 780 | 1,875 |
| 1912..... | 376,082 | 481,493 | 82,757 | 185,821 | 53,119 | 176,056 | 66,500 | 481,250 | | |
| 1913..... | 404,801 | 479,515 | 103,954 | 279,395 | 62,315 | 208,029 | 65,100 | 479,500 | 200 | 1,300 |
| 1914..... | 303,155 | 368,931 | 79,083 | 200,680 | 81,219 | 204,033 | 53,423 | 382,563 | | |

EXPORTS AND IMPORTS.

Statistics of exports and imports of gypsum as compiled from the Reports of Trade and Navigation, are shown in the accompanying tables. The exports of crude gypsum during the calendar year 1914 were 345,830 tons, valued at \$404,234, or an average of \$1.17 per ton, as compared with exports in 1913 of 417,302 tons, valued at \$504,383, or an average of \$1.21 per ton. There were also exports of ground gypsum in 1914 valued at \$35,490, as compared with exports in 1913 valued at \$5,795. The total value of exports of gypsum, both crude and ground, was \$439,724 as compared with exports in 1913 valued at \$510,178.

The imports of gypsum of all grades during the calendar year reached a value of \$75,031, and included crude gypsum 3,572 tons valued at \$16,448 or an average of \$4.60 per ton, ground gypsum 536 tons, valued at \$4,301, or an average of \$8.02 per ton, and Plaster of Paris 7,739 tons, valued at \$54,282, or an average of \$7.01 per ton. For purposes of comparison the imports during 1913 are given herewith. The total value was \$188,252 which included crude gypsum 4,522 tons valued at \$21,763 or an average of \$4.81 per ton, ground gypsum valued at \$11,770, and Plaster of Paris 20,113 tons valued at \$154,719 or an average of \$7.69 per ton. The imports of gypsum, crude and ground, and Plaster of Paris for years past have been very erratic, sudden increases, or sudden decreases from year to year being the rule, e.g., imports of crude from 1910-1914 inclusive were respectively 12,271 tons, 2,035 tons, 3,503 tons, 4,522 tons, and 3,572 tons; and imports of ground were 6,690 tons in 1910, 1,681 tons in 1911, 7,072 tons in 1912, and 536 tons in 1914; and imports of Plaster of Paris from 1910-1914 inclusive were respectively: 19,045 tons, 28,518 tons, 32,496 tons, 20,113 tons, and 7,739 tons. The average importation of Plaster of Paris during the last five years was 21,582 tons as compared with an average of 7,267 tons for the preceding five year period. The average values of imports, too, have ranged between wide limits.

Exports of Crude Gypsum.

| Calendar Year. | NOVA SCOTIA. | | NEW BRUNSWICK. | | ONTARIO. | | TOTAL. | |
|----------------|--------------|---------|----------------|---------|----------|--------|---------|---------|
| | Tons. | Value. | Tons. | Value. | Tons. | Value. | Tons. | Value. |
| | | \$ | | \$ | | \$ | | \$ |
| 1874..... | 67,830 | 68,164 | | | | | 67,830 | 68,164 |
| 1875..... | 86,065 | 86,193 | 5,420 | 5,420 | | | 91,485 | 91,613 |
| 1876..... | 87,720 | 87,590 | 4,925 | 6,616 | 120 | 180 | 92,765 | 94,386 |
| 1877..... | 106,950 | 93,867 | 5,030 | 5,030 | | | 111,980 | 98,897 |
| 1878..... | 88,631 | 76,695 | 16,335 | 16,435 | 489 | 675 | 105,455 | 93,805 |
| 1879..... | 95,623 | 71,353 | 8,791 | 8,791 | 579 | 720 | 104,993 | 80,864 |
| 1880..... | 125,685 | 111,833 | 10,375 | 10,987 | 875 | 1,240 | 136,935 | 124,060 |
| 1881..... | 110,303 | 100,284 | 10,310 | 15,025 | 657 | 1,040 | 121,270 | 116,349 |
| 1882..... | 133,426 | 121,070 | 15,597 | 24,581 | 1,249 | 1,946 | 150,272 | 147,597 |
| 1883..... | 145,448 | 132,834 | 20,242 | 35,557 | 462 | 837 | 166,152 | 169,228 |
| 1884..... | 107,653 | 100,446 | 21,800 | 32,751 | 688 | 1,254 | 130,141 | 134,451 |
| 1885..... | 81,887 | 77,898 | 15,140 | 27,730 | 525 | 787 | 97,552 | 106,415 |
| 1886..... | 118,985 | 114,116 | 23,498 | 40,559 | 350 | 538 | 142,833 | 155,213 |
| 1887..... | 112,557 | 106,910 | 19,942 | 39,295 | 225 | 337 | 132,724 | 146,542 |
| 1888..... | 124,818 | 120,429 | 20 | 50 | 670 | 910 | 125,508 | 121,389 |
| 1889..... | 146,204 | 142,850 | 31,495 | 50,862 | 483 | 692 | 178,182 | 194,404 |
| 1890..... | 145,452 | 139,707 | 30,034 | 52,291 | 205 | 256 | 175,691 | 192,254 |
| 1891..... | 143,770 | 140,438 | 27,536 | 41,350 | 5 | 7 | 171,311 | 181,795 |
| 1892..... | 162,372 | 157,463 | 27,488 | 43,623 | | | 189,860 | 201,086 |
| 1893..... | 132,131 | 122,556 | 30,061 | 36,706 | | | 162,192 | 159,262 |
| 1894..... | 119,569 | 111,586 | 40,843 | 46,538 | | | 160,412 | 158,124 |
| 1895..... | 133,369 | 125,651 | 56,117 | 67,593 | | | 189,486 | 193,244 |
| 1896..... | 116,331 | 109,054 | 64,946 | 77,535 | | | 181,277 | 186,589 |
| 1897..... | 122,984 | 116,665 | 66,222 | 80,485 | | | 189,206 | 197,150 |
| 1898..... | 99,215 | 93,474 | 70,399 | 81,433 | | | 169,614 | 174,907 |
| 1899..... | 104,795 | 99,984 | 96,831 | 108,094 | *½ | 12 | 201,626 | 208,090 |
| 1900..... | | | | | | | 188,262 | 201,912 |
| 1901..... | | | | | | | 236,247 | 231,594 |
| 1902..... | | | | | | | 289,600 | 295,215 |
| 1903..... | | | | | | | 287,496 | 311,580 |
| 1904..... | | | | | | | 298,211 | 316,436 |
| 1905..... | | | | | | | 359,246 | 388,474 |
| 1906..... | | | | | | | 404,464 | 462,814 |
| 1907..... | | | | | | | 375,026 | 424,794 |
| 1908..... | | | | | | | 280,091 | 324,574 |
| 1909..... | | | | | | | 315,201 | 372,286 |
| 1910..... | | | | | | | 346,081 | 416,725 |
| 1911..... | | | | | | | 362,102 | 425,161 |
| 1912..... | | | | | | | 364,643 | 423,208 |
| 1913..... | | | | | | | 417,302 | 504,383 |
| 1914..... | | | | | | | 345,830 | 404,234 |

*Exported from British Columbia.

Exports of Ground Gypsum.

| Calendar Year. | Value. | Calendar Year. | Value. | Calendar Year. | Value. |
|----------------|--------|----------------|--------|----------------|--------|
| | \$ | | \$ | | \$ |
| 1890..... | 105 | 1898..... | 6,448 | 1906..... | 2,934 |
| 1891..... | 588 | 1899..... | 8,123 | 1907..... | 557 |
| 1892..... | 20,255 | 1900..... | 19,834 | 1908..... | 9,765 |
| 1893..... | 22,132 | 1901..... | 15,337 | 1909..... | 2,787 |
| 1894..... | 20,054 | 1902..... | 5,101 | 1910..... | 12,306 |
| 1895..... | 22,233 | 1903..... | 12,457 | 1911..... | 4,429 |
| 1896..... | 21,267 | 1904..... | 2,333 | 1912..... | 6,495 |
| 1897..... | 6,763 | 1905..... | 2,673 | 1913..... | 5,795 |
| | | | | 1914..... | 35,490 |

Imports of Gypsum.

| Fiscal Year. | CRUDE GYPSUM. | | GROUND GYPSUM. | | PLASTER OF PARIS. | |
|--------------------|---------------|--------|----------------|--------|-------------------|---------|
| | Tons. | Value. | Lbs. | Value. | Lbs. | Value. |
| | | \$ | | \$ | | \$ |
| 1880..... | 1,854 | 3,203 | 1,606,578 | 5,948 | 667,676 | 2,376 |
| 1881..... | 1,731 | 3,442 | 1,544,714 | 4,676 | 574,006 | 2,864 |
| 1882..... | 2,132 | 3,761 | 759,460 | 2,576 | 751,147 | 4,184 |
| 1883..... | 1,384 | 3,001 | 1,017,905 | 2,579 | 1,448,650 | 7,867 |
| 1884..... | | 3,416 | 687,432 | 1,936 | 782,920 | 5,226 |
| 1885..... | 1,353 | 2,354 | 461,400 | 1,177 | 689,521 | 4,809 |
| 1886..... | 1,870 | 2,429 | 224,119 | 675 | 820,273 | 5,463 |
| 1887..... | 1,557 | 2,492 | 13,266 | 73 | 594,146 | 4,342 |
| 1888..... | 1,236 | 2,193 | 106,068 | 558 | 942,338 | 6,662 |
| 1889..... | 1,360 | 2,472 | 74,390 | 372 | 1,173,996 | 8,513 |
| 1890..... | 1,050 | 1,928 | 434,400 | 2,136 | 693,435 | 6,004 |
| 1891..... | 376 | 640 | 36,500 | 215 | 1,035,605 | 8,412 |
| 1892..... | 626 | 1,182 | 310,250 | 2,149 | 1,166,200 | 5,595 |
| 1893..... | 496 | 1,014 | 140,830 | 442 | 552,130 | 3,143 |
| 1894..... | | 1,660 | 23,270 | 198 | 422,700 | 2,386 |
| 1895..... | 603 | 960 | 20,700 | 88 | 259,200 | 1,619 |
| 1896..... | 1,045 | 848 | 64,500 | 198 | 297,000 | 2,000 |
| 1897..... | | 772 | 45,000 | 123 | 969,900 | 4,489 |
| 1898..... | 1,147 | 1,742 | 35,700 | 293 | 329,600 | 2,025 |
| 1899..... | 325 | 692 | 33,900 | 338 | 496,300 | 3,120 |
| 1900..... | 77 | 958 | 6,300 | 69 | 849,100 | 6,492 |
| 1901..... | 286 | 1,125 | 65,400 | 1,097 | 502,200 | 3,978 |
| 1902..... | 541 | 1,697 | 56,700 | 249 | 475,300 | 2,641 |
| 1903..... | 1,076 | 2,187 | 68,700 | 228 | 630,800 | 3,599 |
| 1904..... | 249 | 663 | 106,800 | 559 | 625,100 | 2,885 |
| 1905..... | 2,344 | 7,386 | 2,255,700 | 2,681 | 7,924,100 | 37,643 |
| 1906..... | 6,332 | 22,008 | 1,968,600 | 1,799 | 12,866,500 | 43,742 |
| 1907 (9 mos.)..... | 9,189 | 23,410 | 609,600 | 1,619 | 19,849,400 | 58,364 |
| 1908..... | 9,393 | 36,510 | 382,500 | 1,781 | 15,020,000 | 51,328 |
| 1909..... | 10,317 | 35,268 | 6,286,200 | 5,765 | 17,009,000 | 64,849 |
| Calendar Year. | | | | | | |
| 1910..... | 12,271 | 21,073 | 13,380,600 | 13,242 | 38,090,300 | 135,483 |
| 1911..... | 2,035 | 11,792 | 3,362,400 | 3,619 | 57,035,700 | 190,371 |
| 1912..... | 3,503 | 16,254 | 14,144,000 | 19,651 | 64,991,600 | 232,198 |
| 1913..... | 4,522 | 21,763 | | 11,770 | 40,226,400 | 154,719 |
| 1914..... | 3,572 | 16,448 | 1,072,600 | 4,301 | 15,477,500 | 54,282 |

Crude gypsum, duty free. Ground gypsum, duty 15 per cent. Plaster of Paris, duty 12½c. per 100 lbs.

The Nova Scotia production, and the larger part of the New Brunswick production as well, is almost all disposed of in the United States market. The large deposits and the excellent facilities for water transportation are responsible for the gypsum being shipped as quarried to grinding and calcining plants outside these provinces.

Returns from Nova Scotia operators show the tonnage of gypsum mined during recent years to have been as follows: 339,747 tons in 1914, 423,977 tons in 1913, 330,442 tons in 1912, and 337,605 tons in 1911. The decrease in 1914 is partially attributable to the destruction by fire of a large calcining mill in New York which drew its regular supply of crude gypsum from Nova Scotia. Of the total tonnage mined in 1914 about 83 per cent was extracted from quarries in Hants county near Windsor, Walton, and Cheverie, and the rest came from quarries at Quarry St. Ann's, Iona, and McKinnon Harbour, Victoria county, and a quarry near Cheticamp, Inverness county.

In New Brunswick only two properties were operating, both near Hillsborough in Albert county. The tonnage of gypsum mined in 1914

was 86,912 tons as compared with 112,739 tons in 1913, and 82,348 tons in 1912. About 68 per cent of the output was shipped in crude form, either lump or ground, and the balance was calcined, the latter being marketed in Canada.

In Ontario there was an increase over 1913 in quantity of gypsum mined, the figures for recent years being as follows: 89,159 tons in 1914, 71,310 tons in 1913, and 57,086 tons in 1912. The total sales in 1914 including crushed, fine ground, and calcined (both that sold as such, and as an ingredient of wall plaster), amounted to 81,219 tons valued at \$204,033. The total sales of crude, ground and calcined gypsum in 1913 were 62,315 tons valued at \$208,029, the sales including a quantity of alabastine manufactured by one firm and valued at about \$50 per ton.

Manitoba's shipments of gypsum are almost entirely of the calcined grade. In 1914 there was for the first time in the history of the industry in this Province, a conspicuous decrease as compared with the previous year's production. In spite of this though, Manitoba for the first time led all the provinces in value of shipments. The total quantity mined was 64,023 tons as compared with 76,500 tons in 1913, 80,000 tons in 1912, and 53,000 in 1911. The shipments were 53,423 tons chiefly calcined valued at \$382,563, as compared with shipments of 65,100 tons in 1913 valued at \$479,500 and in 1912 of 66,500 tons valued at \$481,250.

The following is a list of the principal active operators:—

| Location. | | Operator and Address. |
|-------------------------|--|--|
| County. | Post Office. | |
| NOVA SCOTIA. | | |
| Cumberland..... | Nappan..... | Maritime Gypsum Co., Ltd., 381 Fourth Ave., New York. |
| Hants..... | Minasville..... | Geo. Hamilton, Minasville, N.S. |
| | Newport Landing..... | Newport Plaster Mining & Manufacturing Co., Ltd., Windsor, N.S. |
| | Walton..... | Rock Plaster Manufacturing Company, 381 Fourth Ave., New York. |
| | Cheverie..... | Noel Plaster Company, Noel, N.S. |
| | Noel..... | Nova Scotia Gypsum Co., Three Mile Plains, N.S. |
| | Three Mile Plains..... | Wentworth Gypsum Company, Wentworth, N.S. |
| | Wentworth..... | Windsor Gypsum Company, Newburgh, N.Y. |
| | Newport Station..... | Windsor Plaster Company, Ltd., Windsor, N.S. |
| | Brooklyn and West Gore..... | |
| Inverness..... | Eastern Harbour..... | Cheticamp Gypsum and Plaster Company, 108 Dominion Express Bldg., Montreal, P.Q. |
| Victoria..... | Iona..... | Iona Gypsum Company, Ltd., Sydney, N.S. Box 362. |
| | Port Hastings..... | Nova Scotia Cement and Plaster Company, 9 Toronto St., Toronto, Ont. |
| | McKinnon's Harbour .. Quarry St. Anns..... | Newark Plaster Company, 17 Battery Place, New York, N.Y. |
| | | Victoria Gypsum & Manufacturing Co., Quarry St. Anns, N.S. |
| NEW BRUNSWICK. | | |
| Albert..... | Hillsborough..... | Albert Manufacturing Company, Hillsborough, N.B. |
| | "..... | Hillsboro Plaster Company, Hillsborough, N.B. |
| Victoria..... | Plaster Rock..... | Stinson-Reeb Builders Supply Company, 45 Adelaide St., Montreal, P.Q. |
| | "..... | John E. Stewart, Andover, N.B. |
| Westmorland..... | Cape Maringouin..... (Near Rockport). | New Brunswick Gypsum Company, Hillsborough, N.B. |
| ONTARIO. | | |
| Haldimand..... | Caledonia..... | The Alabastine Company, Ltd., Paris, Ont. |
| | Lythmore..... | The Crown Gypsum Company, Lythmore, Ont. |
| | Nelles Corners..... | Grand Gypsum Limited, 32 Stinson St., Hamilton, Ont. |
| | Caledonia..... | Haldimand Gypsum Company, Buffalo, N.Y. |
| | "..... | Wm. Smith, Caledonia, Ont., P.O. Box 83. |
| MANITOBA. | | |
| Tp. 32. Range 9 | Gypsumville | Manitoba Gypsum Company, Ltd., Winnipeg, Man. |
| Tp. 33. Ranges 8 and 9. | "..... | Dominion Gypsum Company, P.O. Box 537, Winnipeg, Man |
| BRITISH COLUMBIA. | | |
| | Princeton..... | E. P. Gaillac, Princeton, B.C. |
| | Grand Prairie..... | B. C. Gypsum Company, Victoria, Tr. Bldg., Victoria, B.C. |
| | Merritt..... | Dr. Geo. Schumacher, Merritt, B.C. |

MAGNESITE.

Magnesite production in Canada has been confined to Grenville township, Argenteuil county, Quebec. Deposits are also known to exist in the Eastern Townships of Quebec, and in Atlin, B.C.

The industry in Argenteuil county is still of small proportions, and during the last years mining operations have been at a standstill, but shipments have been made from stock.

The only producer has been The Canadian Magnesite Company (superseded by the North American Magnesite Company), with head office in Montreal. This Company has on its property a calcining mill and a grinding mill. Shipments from the mine are hauled 12 miles to Calumet on the Canadian Pacific Railway. The crude magnesite has been disposed of to manufacturers of carbon dioxide gas, and the calcined material to sulphite mills, and manufacturers of composition flooring. The North American Magnesite Company now state that they "are regularly supplying steel mills with dead burned magnesite."

The use of magnesite for refractory products constitutes its most important application in the industries. Made into refractory bricks, it is used as linings for basic steel furnaces. In "dead burnt" calcined form as originally burned, or as brick, the magnesia is used as a refractory lining for open-hearth furnaces and converters in the steel industry, for copper converter linings, for rotary kiln linings in Portland cement manufacture, for furnace hearths, crucibles, cupels, etc. In spite of a prejudice against the presence of lime, silica, oxide of iron, and alumina, analyses of magnesite imported for use in the metallurgical industry in the United States generally show 3 to 4 per cent of silica, 6 to 8 per cent of iron, and 4 per cent of lime. Magnesite also finds extensive use for the manufacture of magnesium, bisulphate, used in the pulp and paper industry. To a lesser extent it is used in the manufacture of carbon dioxide gas, as an ingredient of oxy-chloride, or Sorel cement, which is used for composition flooring and interior finishings, as a heat insulating pipe covering, as an adulterant in paint, as a binder for briquetting coal, as a fireproof or fire retarding paint, and in the form of refined magnesia salts for medicinal and toilet purposes.

The greater part of the world's supply of magnesite has come from Hungary and Greece. The supply from Hungary was of course cut off from most consumers by the outbreak of the European war, with the result that in Canada, as elsewhere, there have been numerous inquiries concerning the possibility of getting requirements filled from local sources. The shortage in the supply has already caused several parties to make efforts to enter the field as producers among whom may be noted, The Grenville Lumber Company, with head office in Montreal, and a syndicate represented by Newton W. Emmons, Rogers Building, Vancouver, B.C.

Imports of magnesite, and of magnesian fire brick are not shown separately under the classification of the Department of Customs but very considerable quantities have been imported yearly for refractory linings, for kilns, furnaces, and converters.

Statistics of sales of magnesite and of imports of magnesia follow:—

| Calendar Year. | SALES OF MAGNESITE. | | IMPORTS OF MAGNESIA. | |
|----------------|---------------------|--------|----------------------|--------|
| | Tons. | Value. | Tons. | Value. |
| | | \$ | | \$ |
| 1908..... | 120 | 840 | | |
| 1909..... | 330 | 2,508 | | |
| 1910..... | 323 | 2,160 | 233 | 10,847 |
| 1911..... | 991 | 5,531 | 253 | 11,012 |
| 1912..... | 1,714 | 9,645 | 379 | 29,641 |
| 1913..... | 515 | 3,335 | 145 | 12,226 |
| 1914..... | 358 | 2,240 | 127 | 16,429 |

MANGANESE.

The mining of manganese ores in Canada reached considerable proportions between 1880 and 1890 when the annual production ranged from 1,200 to 1,800 tons valued at from \$30,000 to \$50,000. In 1891 the production fell away, and only once since (in 1899) did it exceed 500 tons. In 1907, 1908, 1909, and 1910 there was no production. In 1910 the Nova Scotia Manganese Company started operations on a property at New Ross, Lunenburg county, N.S., and since then they have made small shipments in 1911, 1912, and 1914.

In 1914 production of manganese ore is reported as 28 tons valued at \$1,120, the 1913 production was nil, and the 1912 production was 75 tons valued at \$1,875. The 1914 exports are reported by the Department of Customs as 30 tons valued at \$750, as compared with 8 tons in 1913 valued at \$303 and 10 tons in 1912 valued at \$300. Statistics of annual production and of exports of manganese ore follow:—

Annual Production of Manganese Ore.

| Calendar Year. | Tons. | Value. | Value per ton. | Calendar Year. | Tons. | Value. | Value per ton. |
|----------------|-------|--------|-------------------|----------------|-------|--------|-------------------|
| | | \$ | \$ cts. | | | \$ | \$ cts. |
| 1886..... | 1,789 | 41,499 | 23 20 | 1900..... | 30 | 1,800 | 60 00 |
| 1887..... | 1,245 | 43,658 | 35 07 | 1901*..... | 440 | 4,820 | 10 95 |
| 1888..... | 1,801 | 47,944 | 26 62 | 1902*..... | 172 | 4,062 | 23 62 |
| 1889..... | 1,455 | 32,737 | 22 50 | 1903..... | 91 | 2,775 | 30 49 |
| 1890..... | 1,328 | 32,550 | 24 51 | 1904..... | 66 | 2,740 | 41 51 |
| 1891..... | 255 | 6,694 | 26 25 | 1905*..... | 22 | 1,720 | 78 18 |
| 1892..... | 115 | 10,250 | 89 13 | 1906*..... | 93 | 925 | 9 95 |
| 1893..... | 213 | 14,578 | 68 44 | 1907*..... | 1 | 22 | 22 00 |
| 1894..... | 74 | 4,180 | 56 49 | 1908..... | Nil. | ..... | ..... |
| 1895..... | 125 | 8,464 | 67 71 | 1909..... | Nil. | ..... | ..... |
| 1896*..... | 123½ | 3,975 | 32 19 | 1910..... | Nil. | ..... | ..... |
| 1897*..... | 15½ | 1,166 | 76 46 | 1911..... | 5½ | 300 | 54 55 |
| 1898..... | 50 | 1,600 | 32 00 | 1912..... | 75 | 1,875 | 25 00 |
| 1899..... | 1,581 | 20,004 | 12 65 | 1913..... | Nil. | Nil. | ..... |
| | | | | 1914..... | 28 | 1,120 | 40 00 |

*Exports.

Exports of Manganese Ore.

| Calendar Year. | Tons. | Value. | Calendar Year. | Tons. | Value. |
|----------------|-----------|--------|----------------|-------|--------|
| | | \$ | | | \$ |
| 1873..... | 1,031 | 20,192 | 1894..... | 56 | 3,120 |
| 1874..... | 782 | 16,973 | 1895..... | 108.3 | 6,351 |
| 1875..... | 203 | 5,514 | 1896..... | 123.5 | 3,975 |
| 1876..... | 412 | 8,039 | 1897..... | 15.3 | 1,166 |
| 1877..... | 891 | 15,909 | 1898..... | 11 | 325 |
| 1878..... | 626 | 10,860 | 1899..... | 70 | 2,410 |
| 1879..... | 1,886 | 27,436 | 1900..... | 34 | 1,720 |
| 1880..... | 2,179 | 34,797 | 1901..... | 440 | 4,820 |
| 1881..... | 1,704 | 40,554 | 1902..... | 172 | 4,062 |
| 1882..... | 894 | 25,747 | 1903..... | 135 | 1,889 |
| 1883..... | 1,326 | 25,343 | 1904..... | 123 | 2,706 |
| 1884..... | 603 | 20,089 | 1905..... | 22 | 1,720 |
| 1885..... | 1,684 | 34,649 | 1906..... | 93 | 925 |
| 1886..... | (a) 1,818 | 58,338 | 1907..... | 1 | 22 |
| 1887..... | 1,415 | 34,802 | 1908..... | | |
| 1888..... | 1,181 | 21,832 | 1909..... | 3 | 434 |
| 1889..... | 1,436 | 29,350 | 1910..... | 4 | 160 |
| 1890..... | 1,906 | 36,831 | 1911..... | 4 | 225 |
| 1891..... | 255 | 6,694 | 1912..... | 10 | 300 |
| 1892..... | 143 | 8,205 | 1913..... | 8 | 303 |
| 1893..... | 133 | 12,521 | 1914..... | 30 | 750 |

(a) 250 tons from Cornwallis should more correctly be classed under the heading of mineral pigments.

The manganese ores which have been mined in Canada are pyrolusite, manganite, psilomelane, and bog manganese. These were mostly ores with a high manganese content, and fairly free from deleterious constituents. The largest part of the production was consequently put to those uses where a high grade raw material is desired, e.g., as an oxidizing agent in the manufacture of chlorine, bromine, manganates, and permanganates, as a decolorizer of glass, porcelain, and enamels, as a colouring material in dyeing and pottery and paint manufacture, as a drier in paints and varnishes, in the manufacture of dry and Leclanche cells, etc.

By far the greater part of the world's production of manganese, though, enters the market as spiegeleisen, and ferro-manganese. These are used principally in the steel industry where they are added to both Bessemer and open-hearth steels, the manganese acting as a deoxidizer, recarbonizer, and neutralizer of sulphur.

Over 50 per cent of the world's annual production of manganese ore has been coming from Russian territory in the vicinity of the Black sea, and a large share from British India. Because of the supply coming from the sources mentioned and because during the early days of the European war, the exportation of manganese from British ports to destinations other than those within the British Empire, or in France or Russia, was prohibited, the ferro-manganese market during the closing months of 1914 was in a most disturbed condition. In this country the difficulty experienced by manufacturers of steel products in securing their requirements has led to considerable inquiry as to the possibility of securing manganese from Canadian sources,

The yearly consumption of pyrolusite in Canada has been stated in a recent publication of the Mines Branch¹ to be upwards of 1,363 tons, of which less than 2 per cent is of domestic origin. No separate record of imports of manganese ores is kept in the classification of the Customs Department, but statistics for imports of "oxide of manganese" are listed. In 1914 these imports were 1,702 tons valued at \$42,287 or an average of \$24.85 per ton, as compared with 2,588 tons in 1913 valued at \$46,990, or an average value of \$18.16 per ton. In 1912 the average value per ton was \$22.05, in 1911 it was \$23.50, and in 1910 it was \$26.40. Imports of ferro-silicon, spiegeleisen, and ferro-manganese for 1914 were 22,147 tons valued at \$549,485, as compared with 30,355 tons in 1913 valued at \$940,443.

Statistics of imports of oxide of manganese follow:—

Imports of Oxide of Manganese.

| Fiscal Year. | Lbs. | Value. | Fiscal Year. | Lbs. | Value. |
|--------------|---------|--------|--------------------|-----------|--------|
| | | \$ | | | \$ |
| 1884..... | 3,989 | 258 | 1900..... | 126,725 | 4,155 |
| 1885..... | 36,778 | 1,794 | 1901..... | 272,134 | 8,176 |
| 1886..... | 44,967 | 1,753 | 1902..... | 476,331 | 5,360 |
| 1887..... | 59,655 | 2,933 | 1903..... | 279,611 | 8,051 |
| 1888..... | 65,014 | 3,022 | 1904..... | 275,696 | 7,051 |
| 1889..... | 52,241 | 2,182 | 1905..... | 235,289 | 6,832 |
| 1890..... | 67,452 | 3,192 | 1906..... | 244,620 | 5,508 |
| 1891..... | 92,087 | 3,743 | 1907 (9 mos.)..... | 386,404 | 11,087 |
| 1892..... | 76,097 | 3,530 | 1908..... | 732,242 | 17,863 |
| 1893..... | 94,116 | 3,696 | 1909..... | 382,137 | 6,561 |
| 1894..... | 101,863 | 4,522 | Calendar Year..... | | |
| 1895..... | 64,151 | 2,781 | 1910..... | 1,297,020 | 17,133 |
| 1896..... | 108,590 | 4,075 | 1911..... | 1,924,520 | 22,612 |
| 1897..... | 70,663 | 2,741 | 1912..... | 2,512,610 | 27,707 |
| 1898..... | 130,456 | 5,047 | 1913..... | 5,175,195 | 46,990 |
| 1899..... | 141,356 | 5,539 | 1914..... | 3,404,863 | 42,287 |

A recent publication² of the Geological Survey Branch of the Department of Mines enumerates the following localities in which occurrences of manganese ores are known:—

Province of Nova Scotia.

| | | |
|-------------|---------|---|
| Antigonish | county. | Pomquet river, Afton. |
| Colchester | " | Wasson Bluff, Salmon River, Onslow, Londonderry. |
| Cumberland | " | Salem, Parrsboro, River Hebert (near Westchester.) |
| Cape Breton | " | South side of Grand Mira. |
| Halifax | " | Musquodoboit, Watt Section of Sheet Harbour. |
| Hants | " | Cheverie, Kennetcook Corners, Minasville, Tennycape, Walton, Douglas. |
| Kings | " | Horton Mt., Morristown, North Alton River (near Kentville), Prospect, South Mountain. |
| Lunenburg | " | Wallaback Lake (near New Ross). |
| Pictou | " | Bridgeville, Springville, Piedmont. |

¹"Non-Metallic Minerals: In Canadian Manufacturing," Fréchette. Mines Branch, Dept. of Mines, Ottawa, Canada, 1915, No. 305.

²A List of Canadian Mineral Occurrences, R.A.A. Johnston, Geol. Survey Branch, Dept. of Mines, Ottawa, Memoir No. 74.

Province of New Brunswick.

| | |
|----------------|---|
| Albert county. | Shepody Mt., Gowland Mt., Elgin, Dawson Settlement, Meldona Creek, Sawmill Creek. |
| Carleton “ | Woodstock. |
| Charlotte “ | Lyndfield, Moore Mills. |
| Gloucester “ | Tetagouche Falls. |
| Kent “ | Richibucto. |
| Kings “ | Bull Moose Hills, Jordan Mt., Markhamville. |
| St. John's “ | Quaco. |
| York “ | Queensbury. |

Province of Quebec.

All believed to be of limited extent.

| | |
|-------------------|---------------------------------------|
| Beauce county. | Aubert-Gallion, Tring and Ste. Marie. |
| Brome “ | Bolton XII 20. |
| Magdalen Islands. | Amherst Island. |
| Quebec county. | On St. Louis Road near Quebec city. |
| Richmond “ | Cleveland XIII 16. |
| Stanstead “ | Stanstead X 9. |
| Temiscouata “ | Cacouna. |

MICA.

Most of the various minerals of the mica group have been found in Canada. Lepidolite occurrences have been noted in British Columbia, Nova Scotia, and Quebec; biotite occurrences in Ontario and Quebec; muscovite occurrences in British Columbia, Manitoba, Nova Scotia, Ontario, and Quebec; and phlogopite occurrences in Baffinland, Ontario, and Quebec. Only the phlogopite (or amber mica) occurrences of Ontario and Quebec have been proven to be of economic interest. These have been the subject of special investigation by the Mines Branch, Ottawa.¹ The muscovite occurrences at Tete Jaune Cache, and Big Bend in British Columbia have also been specially investigated by the Mines Branch² but as yet they have made no production.

Canada's production of mica has come exclusively from two fields: one, in the Province of Quebec, a short distance to the north of the city of Ottawa, and the other embracing parts of the counties of Lanark, Leeds, and Frontenac, in the Province of Ontario. The city of Ottawa (and the adjacent city of Hull) lying between these two fields is the centre to which almost all the production of the various mines and numerous small prospects is shipped for trimming, grading, and marketing. In preparation for the market a considerable proportion of the tonnage received is cobbled out, with the result that the exports, though of smaller tonnage than the shipments from the mines, usually exceed them in total value because of being of much higher grade.

The statistics as to value of production should be considered with discretion and with due regard to the conditions under which the industry is conducted. The condition in which mica is shipped from the mines varies greatly: one operator ships his output cleaned and trimmed, while the output of another is in a rough cobbled state, with consequent noteworthy differences in prices realized. And further, companies operating trimming shops as well as mines may place only a nominal value on shipments from mines to trimming shops.

Shipments of mica from mines in Canada in 1914 showed a 46 per cent decrease from 1913 shipments, but were about equal in quantity to the 1911 and 1912 shipments. The value of the shipments was the smallest since 1897.

The decrease in production in recent years is no doubt due partly to general decreased industrial activity, but, as pointed out by Mr. de Schmid³ it may also be largely due to lack of uniformity in grading of mica for export. This lack of uniformity in grading of Canadian exports (which are exclusively amber mica, superior in many respects to muscovite and biotite) prevents

¹"Mica: Its Occurrence, Exploitation and Uses." H. S. deSchmid, Mines Branch, Dept. of Mines, Ottawa, No. 118.

²Mines Branch, Dept. of Mines, Ottawa, Summary Report, 1913, p. 42.

³"Mica: Its Occurrence, Exploitation and Uses," H. S. deSchmid, Mines Branch, Dept. of Mines, Ottawa, No. 118. pp. 24 and 55-58.

the Canadian article successfully competing in foreign markets with the carefully graded output of India, the world's greatest producer of mica. An increasing production of phlogopite from Ceylon, South Africa, and South America, is probably another factor preventing Canadian exports finding a wider market.

The shipments from mines in 1914 according to returns received from producers were 595 tons valued at \$109,061 or an average of \$183.30 per ton, as compared with shipments in 1913 of 1,104 tons valued at \$194,304, and in 1912 of 580 tons valued at \$143,976. The contributions to the year's production by provinces were as follows: Quebec, 246 tons valued at \$62,794, or an average of \$255.26 per ton, and Ontario, 349 tons valued at \$46,267, or an average of \$132.57 per ton.

Tables showing the annual production by provinces during recent years, and the total value of the annual production from 1886 to 1908 follow:—

Annual Production of Mica by Provinces.

| Calendar Year. | QUEBEC. | | | ONTARIO. | | | TOTAL. | | |
|----------------|---------|---------|----------|----------|---------|----------|--------|---------|----------|
| | Tons. | Value. | Average. | Tons. | Value. | Average. | Tons. | Value. | Average. |
| | | \$ | \$ cts. | | \$ | \$ cts. | | \$ | \$ cts. |
| 1909... | 128 | 93,298 | 728 89 | 241 | 54,484 | 226 07 | 369 | 147,782 | 400 49 |
| 1910... | 316 | 87,295 | 276 25 | 442 | 103,090 | 233 24 | 758 | 190,385 | 251 17 |
| 1911... | 217 | 69,465 | 320 12 | 373 | 59,212 | 158 75 | 590 | 128,677 | 218 10 |
| 1912... | 196 | 81,044 | 413 48 | 384 | 62,932 | 163 89 | 580 | 143,976 | 248 23 |
| 1913... | 626 | 125,488 | 200 46 | 478 | 68,816 | 143 97 | 1,104 | 194,304 | 176 00 |
| 1914... | 246 | 62,794 | 255 26 | 349 | 46,267 | 132 57 | 595 | 109,061 | 183 30 |

Annual Production of Mica, 1886-1908.

| Calendar Year. | Value. | Calendar Year. | Value. | Calendar Year. | Value. |
|----------------|---------|----------------|---------|----------------|---------|
| | \$ | | \$ | | \$ |
| 1886..... | 29,008 | 1894..... | 45,581 | 1902..... | 135,904 |
| 1887..... | 29,816 | 1895..... | 65,000 | 1903..... | 177,857 |
| 1888..... | 30,207 | 1896..... | 60,000 | 1904..... | 160,777 |
| 1889..... | 28,718 | 1897..... | 76,000 | 1905..... | 178,235 |
| 1890..... | 68,074 | 1898..... | 118,375 | 1906..... | 303,913 |
| 1891..... | 71,510 | 1899..... | 163,000 | 1907..... | 312,599 |
| 1892..... | 104,745 | 1900..... | 166,000 | 1908..... | 139,871 |
| 1893..... | 75,719 | 1901..... | 160,000 | | |

During the past six years the total quantity of mica exported is equivalent to about 60 per cent of the shipments from the mines during the same period. The average value of the exports per ton for the period 1909-1914 inclusive is \$669.22, while the average value per ton of mica shipped from mines for the same period was only \$228.77. As usual, by far the larger proportion of the exports went to United States consumers.

Tables showing the annual exports and the distribution of the exports by countries during recent years follow:—

Annual Exports of Mica.

| Calendar Year. | Value. | Calendar Year. | Value. | Calendar Year. | Tons. | Value. |
|----------------|--------|----------------|---------|----------------|-------|---------|
| | \$ | | \$ | | | \$ |
| 1887..... | 3,480 | 1896..... | 47,756 | 1905..... | ..... | 179,049 |
| 1888..... | 23,563 | 1897..... | 69,101 | 1906..... | 912 | 581,919 |
| 1889..... | 30,597 | 1898..... | 110,507 | 1907..... | 558 | 422,172 |
| 1890..... | 22,468 | 1899..... | 158,002 | 1908..... | 290 | 198,839 |
| 1891..... | 37,590 | 1900..... | 146,750 | 1909..... | 359 | 256,834 |
| 1892..... | 86,562 | 1901..... | 152,553 | 1910..... | 469 | 330,903 |
| 1893..... | 70,081 | 1902..... | 391,812 | 1911..... | 347 | 242,548 |
| 1894..... | 38,971 | 1903..... | 196,020 | 1912..... | 448 | 334,054 |
| 1895..... | 48,525 | 1904..... | 198,482 | 1913..... | 409 | 240,775 |
| | | | | 1914..... | 335 | 178,940 |

Exports of Mica by Countries, 1912, 1913, and 1914.

| | 1912. | | 1913. | | 1914. | |
|-------------------------|-------|---------|-------|---------|-------|---------|
| | Tons. | Value. | Tons. | Value. | Tons. | Value. |
| | | \$ | | \$ | | \$ |
| To Great Britain..... | 68 | 35,959 | 71 | 33,273 | 70 | 37,969 |
| To United States..... | 379 | 297,345 | 333 | 202,155 | 242 | 126,220 |
| To other countries..... | 1 | 750 | 5 | 5,347 | 23 | 14,751 |
| Total..... | 448 | 334,054 | 409 | 240,775 | 335 | 178,940 |

As shown in the last table almost the entire quantity of mica exported finds a market in the United States and Great Britain. Imports into the United States from Canada in 1914 were about the same as in 1911 and 1912, being 340 tons (or 42.2 per cent of the total United States imports) with an average value of \$367.01 per ton. Imports from other countries had an average value of \$857.66 per ton.

Statistics of the imports of mica into the United States, and Great Britain, showing the relative importance of Canada as a source of supply for each are given in the following tables:—

Imports of Mica into the United States.¹

| Year ending June 30. | IMPORTS FROM CANADA. | | TOTAL IMPORTS FROM ALL COUNTRIES. | |
|----------------------|----------------------|---------|-----------------------------------|-----------|
| | Short tons. | Value. | Short tons. | Value. |
| | | \$ | | \$ |
| 1895..... | 273 | 39,637 | 410 | 127,515 |
| 1896..... | 310 | 57,908 | 632 | 214,997 |
| 1897..... | 208 | 54,630 | 441 | 187,845 |
| 1898..... | 233 | 53,854 | 313 | 94,294 |
| 1899..... | 512 | 131,310 | 808 | 259,228 |
| 1900..... | 549 | 136,981 | 1,019 | 314,882 |
| 1901..... | 484 | 161,741 | 1,011 | 369,644 |
| 1902..... | 427 | 184,287 | 903 | 384,818 |
| 1903..... | 417 | 196,470 | 973 | 414,953 |
| 1904..... | 287 | 137,191 | 693 | 306,937 |
| 1905..... | 253 | 121,560 | 594 | 296,362 |
| 1906..... | 539 | 328,991 | 1,206 | 731,484 |
| 1907..... | 767 | 596,321 | 1,724 | 1,295,606 |
| 1908..... | 172 | 140,166 | 655 | 567,550 |
| 1909..... | 167 | 132,941 | 403 | 313,525 |
| 1910..... | 434 | 333,196 | 1,008 | 682,539 |
| 1911..... | 316 | 239,964 | 872 | 612,936 |
| 1912..... | 362 | 213,750 | 742 | 513,792 |
| 1913..... | 639 | 218,365 | 1,634 | 1,003,158 |
| 1914..... | 340 | 124,785 | 466 | 399,669 |

¹The Foreign Commerce and Navigation of the United States.

Imports of Mica into Great Britain.*

| | 1912. | | 1913. | | 1914. | |
|--------------------------------|-----------|---------|-----------|---------|-----------|---------|
| | Pounds. | Value. | Pounds. | Value. | Pounds. | Value. |
| | | \$ | | \$ | | \$ |
| Germany..... | 100,800 | 18,946 | 109,312 | 16,751 | 69,552 | 14,220 |
| United States..... | 113,680 | 6,035 | 99,568 | 4,983 | 206,640 | 12,395 |
| Brazil..... | 3,584 | 788 | | | | |
| Other foreign countries..... | 149,520 | 27,263 | 144,032 | 14,240 | 54,768 | 30,947 |
| British India..... | 3,995,264 | 653,876 | 4,499,936 | 700,123 | 2,745,008 | 460,392 |
| Canada..... | 120,736 | 42,797 | 154,896 | 43,591 | 137,200 | 37,040 |
| Other British possessions..... | 59,696 | 14,123 | 35,392 | 9,607 | 38,080 | 5,787 |
| Total..... | 4,543,280 | 763,828 | 5,043,136 | 789,295 | 3,251,248 | 560,781 |

*British Trade Report.

The following is a list of the operators of mica mines who have sent in returns to the Statistical Division of the Mines Branch in 1913 and 1914.

| Operator and Address. | Location of Mine. | |
|--|-------------------|-------------------------------------|
| | County. | Township and Lot. |
| <i>Ontario.</i> | | |
| John H. Adams & Co., Brockville, Ont. | Lanark | N. Burgess, Tully lots. |
| Dom. Improvement & Development Co., P.O. Box 26, Perth, Ont. | " | " V, 3, 9, 15. |
| Smith & Sewell, Stanleyville, Ont., R.R. No. 3 | " | " VI, 1, 9. |
| W. L. McLaren, Nevis Cottage, Perth, Ont. | " | " VI, E $\frac{1}{2}$ 13. |
| Kent Bros., Kingston, Ont. | " | " IX, 4. |
| | " | " VIII, W $\frac{1}{2}$ 2, |
| | " | E $\frac{1}{2}$ 3. |
| Jas. Richardson & Sons, Kingston, Ont. | " | " V, W $\frac{1}{2}$ 13. |
| Loughboro Mining Company, Schenectady, N.Y. | Frontenac | Loughborough X, W $\frac{1}{2}$ 1. |
| Frontenac Mica Company, Sydenham, Ont. | " | " VII, W $\frac{1}{2}$ 11 |
| The Birch Lake Mining Company, 115 York, Ottawa, Ont. | " | " VIII, N $\frac{1}{2}$ 10. |
| J. W. Trousdale, Sydenham, Ont. | " | " IX, 6, X, S $\frac{1}{2}$ 6 |
| S. H. Orser, Perth Road, Ont. | " | " X, 8. |
| J. P. Tett & Bro., Bedford Mills, Ont. | " | " VIII, 12, 13. |
| Kent Bros. & J. Stoness, Kingston, Ont. | " | Bedford VIII, 4. |
| Anglin Mica Company, Ltd., Kingston, Ont. | " | " IV, 12, VI, 30. |
| G. M. Macdonnell, Kingston, Ont. | " | " Devils Lake. |
| | " | Storrington XIV, N $\frac{1}{2}$ 8. |
| <i>Quebec.</i> | | |
| William Argall, Laurel, Que. | Argenteuil | Harrington, IV, 9. |
| E. Rodier, Montreal, Que., Box 2415 | " | Wentworth, X, 19a, 19b. |
| Adelard Morin, Val de Bois, Que. | " | Wentworth, X, E $\frac{1}{2}$ 21. |
| J. B. Gorman, Buckingham, Que. | Labelle | Bowman, III, 17. |
| | " | Lochaber XIII, 19. |
| J. B. Gauthier, Buckingham, Que. | " | Buckingham, IV, 21. |
| H. T. Flynn, Hull, Que., 108 Montcalm | " | Villeneuve, II, W $\frac{1}{2}$ 2. |
| W. L. Parker, Buckingham, Que. | " | Derry II, 31, etc. |
| | " | " I, 5. |
| Richard & Company, L'Ange Gardien, Que. | Ottawa | Portland East 1a. |
| Wm. Cleland | Montmorency | Petit Pre (Post Office). |
| Laurentide Mica Co., Ltd., Pittsburgh, Pa., Box 911 | Ottawa | Cameron II, 10. |
| | " | Hull VII, 18, 19, XI, 16b. |
| The Capital Mica Co., Ltd., Ottawa, Ont. | " | Templeton IX, 15a, 15b. |
| O'Brien & Fowler, Ottawa, Can. | " | Wakefield II, 23a. |
| | " | Portland East, I, 6, 7; |
| | " | IX, 30, 31. |
| Brown Bros., Cantley, Que. | " | Templeton IV, 1, XII, 4. |
| Vavasour Mining Assoc., Ottawa, Can., 22 Metcalfe | " | Villeneuve I, 30, 31; IV, 1. |
| R. McConnell, Toronto, 32 Adelaide E. | " | Hull VI, 20, XII, 11a. |
| J. A. Wilson, Cantley, Que. | " | " XII, 10. |
| Kellar Bros., Cascades, Que. | " | " XIV, N $\frac{1}{2}$ 10 B. |
| Webster & Company, Ottawa, Can., 174 Stewart | " | " XVI, 13. |
| Jno. Burns, Buckingham, Que. | " | " XV, 25. |
| Progressive Mining Co., Ltd., Ottawa, Can. 124 Rideau .. | " | Portland West X, 2, 4, 5. |
| Wallingford Mica & Mining Co., Perkins, Que. | " | Templeton VIII, 15, 16, 17; |
| | " | XIII, 4, 5. |
| Wallingford Bros., Ltd., Perkins, Que. | " | Portland East, I, 1. |
| Watts & Noble, Toronto, Ont., 19 Chestnut Park | " | " IX, 4. |
| Blackburn Bros., Ottawa, Can., 134 Wellington | " | " XI, 9, 10. |
| Jos. Morris, Wilsons Corners, Que. | " | Wakefield, II, 17. |
| R. J. McGlashan, Wilsons Corners, Que. | " | " VI, 2, 6, 27. |
| Jos. Tomkiewicz, Poltimore, Que. | " | " VIII, 25. |
| Wm. Baillie, Aylmer East, Que. | Pontiac | Onslow, VII, 22. |
| Cross & Wilson, Cascades, Que. | " | Thorne, (P.O. Schwartz). |
| Geo. Nesbitt, Wakefield, Que. | " | " (P. O. Ladysmith). |
| Nitz and Schock, Schwartz, Que. | " | " VII, 13, 14. |

MINERAL PIGMENTS.

OCHRES.

In 1914 the total production of ochres and iron oxides (used for other purposes than the recovery from them of their metallic contents), was 5,890 tons valued at \$51,725, as compared with a production in 1913 of 5,987 tons valued at \$41,774, and a production in 1912 of 7,654 tons valued at \$32,410.

The 1914 production included 2,140 tons of ochres, valued at \$44,225 or an average of \$20.67 per ton, used for paint manufacture, and 3,750 tons valued at \$7,500 shipped to gas works, while the 1913 production included 2,362 tons valued at \$35,430 or an average of \$15 per ton, used for paint manufacture, and 3,625 tons valued at \$6,344 shipped to gas works.

The ochres used in paint manufacture are calcined, washed, and fine ground at the point of production, while that used for the purification of illuminating gas is shipped in crude form to gas companies.

Statistics of the production since 1886 are shown in the following table:—

Annual Production of Ochres and Iron Oxides.

| Calendar Year. | Tons. | Value. | Calendar Year. | Tons. | Value. |
|----------------|-------|--------|----------------|-------|--------|
| | | \$ | | | \$ |
| 1886..... | 350 | 2,350 | 1900..... | 1,966 | 15,398 |
| 1887..... | 485 | 3,733 | 1901..... | 2,233 | 16,735 |
| 1888..... | 397 | 7,900 | 1902..... | 4,955 | 30,495 |
| 1889..... | 794 | 15,280 | 1903..... | 6,266 | 32,760 |
| 1890..... | 275 | 5,125 | 1904..... | 3,925 | 24,995 |
| 1891..... | 900 | 17,750 | 1905..... | 5,105 | 34,675 |
| 1892..... | 390 | 5,800 | 1906..... | 6,758 | 36,125 |
| 1893..... | 1,070 | 17,710 | 1907..... | 5,828 | 35,570 |
| 1894..... | 611 | 8,690 | 1908..... | 4,746 | 30,440 |
| 1895..... | 1,339 | 14,600 | 1909..... | 3,940 | 28,093 |
| 1896..... | 2,362 | 16,045 | 1910..... | 4,813 | 33,185 |
| 1897..... | 3,905 | 23,560 | 1911..... | 3,622 | 28,333 |
| 1898..... | 2,226 | 17,450 | 1912..... | 7,654 | 32,410 |
| 1899..... | 3,919 | 20,000 | 1913..... | 5,987 | 41,774 |
| | | | 1914..... | 5,890 | 51,725 |

The working of ochre deposits in Canada has been chiefly confined to those deposits found between Champlain and Three Rivers, in the Province of Quebec, a short distance from the shore of the St. Lawrence river. In 1912 there was a small production from a deposit at St. Joseph de Nicolet, Quebec, but it has not since been operated.

In Ontario there have been a few small outputs from an ochre deposit at Campbellville, Halton county, but it has not been operated since 1911.

The only active operators in the ochre industry in 1914 were the following:—

The Canada Paint Company, Limited, Montreal, Que.

The Champlain Oxide Company, Three Rivers, Que.

Thos. H. Argall, Three Rivers, Que.

In previous years production has been reported by:—

Francois Ouellette, St. Joseph de Nicolet, Que.

Ontario Mineral Paint Company, Campbellville, Ont.

The exports of iron oxide, or mineral pigments in 1914 are reported as 1,777 tons, valued at \$22,311, as compared with 1,956 tons in 1913 valued at \$18,931. Statistics of exports from 1897 follow:—

Exports of Mineral Pigments, Iron Oxides, etc, etc.

| Calendar Year. | Tons. | Value. | Calendar Year. | Tons. | Value. |
|----------------|-------|--------|----------------|-------|--------|
| | | \$ | | | \$ |
| 1897..... | 512 | 7,706 | 1906..... | 139 | 2,379 |
| 1898..... | 283 | 4,227 | 1907..... | 191 | 10,043 |
| 1899..... | 308 | 5,408 | 1908..... | 125 | 4,850 |
| 1900..... | 651 | 7,154 | 1909..... | 658 | 7,956 |
| 1901..... | 401 | 8,233 | 1910..... | 1,746 | 29,839 |
| 1902..... | 352 | 6,182 | 1911..... | 2,000 | 27,070 |
| 1903..... | 676 | 12,770 | 1912..... | 3,016 | 34,513 |
| 1904..... | 416 | 7,260 | 1913..... | 1,956 | 18,931 |
| 1905..... | 353 | 7,704 | 1914..... | 1,777 | 22,311 |

Imports of mineral pigments are entered under two classifications: (1) ochres and ochrey earths, and raw siennas, duty 20 per cent, and (2) oxides, dry fillers, fireproofs, umbers, and burnt siennas, n.e.s., duty 25 per cent. For 1914, imports under the first classification were 1,532 tons valued at \$33,197, and under the second 4,023 tons valued at \$244,867, or a total of 5,555 tons valued at \$278,064. The 1913 imports under the first classification were 1,663 tons valued at \$43,119, and under the second 4,387 tons valued at \$240,435 or a total of 6,050 tons valued at \$283,554.

Statistics of imports appear in the following tables:—

Imports of Ochres and Pigments, 1913 and 1914.

| | Duty. | 1913. | | 1914. | |
|--|-------|------------|---------|------------|---------|
| | | Lbs. | \$ | Lbs. | \$ |
| Ochres and ochrey earths and raw siennas..... | 20% | 3,325,566 | 43,119 | 3,064,776 | 33,197 |
| Oxides, dry fillers, fireproofs, umbers and burnt siennas n.e.s..... | 25% | 8,774,448 | 240,435 | 8,045,721 | 244,867 |
| Total..... | | 12,100,014 | 283,554 | 11,110,497 | 278,064 |

Annual Imports of Ochres and Pigments.

| Fiscal Year. | Lbs. | Value. | Fiscal Year. | Lbs. | Value. |
|--------------|-----------|--------|--------------------|------------|---------|
| | | \$ | | | \$ |
| 1880..... | 571,454 | 6,544 | 1898..... | 2,126,592 | 26,307 |
| 1881..... | 677,115 | 8,972 | 1899..... | 2,444,698 | 31,092 |
| 1882..... | 731,526 | 8,202 | 1900..... | 2,474,537 | 32,017 |
| 1883..... | 898,376 | 10,375 | 1901..... | 2,092,067 | 27,267 |
| 1884..... | 533,416 | 6,398 | 1902..... | 2,530,743 | 33,909 |
| 1885..... | 1,119,177 | 12,782 | 1903..... | 3,215,346 | 42,243 |
| 1886..... | 1,100,243 | 12,267 | 1904..... | 2,767,580 | 36,636 |
| 1887..... | 1,460,128 | 17,067 | 1905..... | 3,122,690 | 35,887 |
| 1888..... | 1,725,460 | 17,664 | 1906..... | 4,321,530 | 57,397 |
| 1889..... | 1,342,783 | 12,994 | 1907 (9 mos.)..... | 2,926,528 | 39,675 |
| 1890..... | 1,394,811 | 14,066 | 1908..... | 3,749,132 | 39,923 |
| 1891..... | 1,528,696 | 20,550 | 1909..... | 2,122,781 | 27,540 |
| 1892..... | 1,708,645 | 22,908 | Calendar Year. | | |
| 1893..... | 1,968,645 | 23,134 | 1910..... | 4,227,660 | 55,393 |
| 1894..... | 1,358,326 | 18,951 | 1911..... | 4,397,514 | 53,092 |
| 1895..... | 793,258 | 12,048 | 1912..... | 4,998,089 | 69,621 |
| 1896..... | 1,159,494 | 16,954 | 1913..... | 12,100,014 | 283,554 |
| 1897..... | 1,504,044 | 18,504 | 1914..... | 11,110,497 | 278,064 |

MINERAL WATER.

The statistics of production given herewith represent, as usual, as closely as can be secured, the value of mineral water shipped from mineral springs in bottles, barrels, or other containers, and do not include any estimate of the value of mineral water used at springs for drinking or bathing purposes; nor are the natural pure spring waters included, of which a considerable quantity is sold in bottled form.

The value of the production in 1914 was \$134,111 as compared with \$173,677 in 1913, and \$172,465 in 1912.

The imports of mineral and aerated waters during the calendar year 1914 were valued at \$199,327, during 1913 at \$257,153, and during 1912 at \$273,698.

The exports of mineral water during 1914 were valued at \$2,367 as compared with exports in 1913 valued at \$1,496.

Statistics of production, imports and exports, are given in the following tables:—

Annual Production of Mineral Water.

| Calendar Year. | Gals. | Value. | Calendar Year. | Gals. | Value. | Calendar Year. | Gals. | Value. |
|----------------|---------|---------|----------------|---------|---------|----------------|-------|---------|
| | | \$ | | | \$ | | | \$ |
| 1888..... | 124,850 | 11,456 | 1897..... | 749,691 | 141,477 | 1906..... | | 100,000 |
| 1889..... | 424,600 | 37,360 | 1898..... | 555,000 | 100,000 | 1907..... | | 136,020 |
| 1890..... | 561,165 | 66,031 | 1899..... | | 100,000 | 1908..... | | 151,953 |
| 1891..... | 427,485 | 54,268 | 1900..... | | 75,000 | 1909..... | | 175,173 |
| 1892..... | 640,380 | 75,348 | 1901..... | | 100,000 | 1910..... | | 199,563 |
| 1893..... | 725,096 | 108,347 | 1902..... | | 100,000 | 1911..... | | 223,758 |
| 1894..... | 767,460 | 110,040 | 1903..... | | 100,000 | 1912..... | | 172,465 |
| 1895..... | 739,382 | 126,048 | 1904..... | | 100,000 | 1913..... | | 173,677 |
| 1896..... | 706,372 | 111,736 | 1905..... | | 100,000 | 1914..... | | 134,111 |

Annual Imports of Mineral Water.

| Fiscal Year. | Value. | Fiscal Year. | Value. | Fiscal Year. | Value. |
|--------------|--------|--------------|---------|---------------------|---------|
| | \$ | | \$ | | \$ |
| 1880..... | 41,797 | 1892..... | 17,913 | 1904..... | 137,304 |
| 1881..... | 55,763 | 1893..... | 27,909 | 1905..... | 161,790 |
| 1882..... | 57,953 | 1894..... | 28,130 | 1906..... | 178,639 |
| 1883..... | 49,546 | 1895..... | 27,879 | 1907 (9 months).... | 143,416 |
| 1884..... | 48,613 | 1896..... | 32,674 | 1908..... | 153,831 |
| 1885..... | 55,864 | 1897..... | 22,142 | 1909..... | 159,221 |
| 1886..... | 47,006 | 1898..... | 33,314 | Calendar Year. | |
| 1887..... | 52,989 | 1899..... | 38,046 | 1910..... | 202,306 |
| 1888..... | 54,891 | 1900..... | 30,343 | 1911..... | 229,367 |
| 1889..... | 66,331 | 1901..... | 40,802 | 1912..... | 273,698 |
| 1890..... | 71,521 | 1902..... | 91,871 | 1913..... | 257,153 |
| 1891..... | 15,721 | 1903..... | 108,130 | 1914..... | 199,327 |

Annual Exports of Mineral Water.

| Calendar Year. | Gallons. | Value. | In bottles. Value. | Total. |
|----------------|----------|--------|-----------------------|--------|
| | | \$ | \$ | \$ |
| 1910..... | 16,136 | 7,169 | ..... | 7,169 |
| 1911..... | 26,495 | 12,952 | ..... | 12,952 |
| 1912..... | 9,690 | 4,710 | ..... | 4,710 |
| 1913..... | 3,640 | 526 | 970 | 1,496 |
| 1914..... | 2,287 | 599 | 1,768 | 2,367 |

The following is a list of the principal producers of mineral water:—

| Operator. | Address. | Location of Spring. | | Brand of Water. |
|--|-----------------------------------|-------------------------|--------------------|-------------------|
| | | County. | P.O. | |
| Havelock Mineral Springs Company, Ltd. | Moncton, N.B..... | Kings, N.B..... | Havelock..... | ..... |
| Radnor Water Company, Ltd. | Montreal, 500 McGill Bldg. | Champlain, Que.... | Radnor Forges | Radnor. |
| Cypress Roy..... | St. Germain, Que.... | Kamouraska, Que.... | ..... | St. Germain. |
| Viauville Mineral Springs..... | Montreal, Viauville, 1 First Ave. | Laval, Que..... | ..... | ..... |
| St. Leon Waters, Limited..... | Toronto, 1 Toronto St. | Maskinonge, Que.... | St. Leon..... | Mirach. |
| Bedard, Dion et Cie..... | Quebec, 22 Bigouette | "..... | Nancy..... | St. Leon. |
| Chas. Gurd & Co., Ltd..... | Montreal, 76 Bleury | Vercheres, Que.... | Varennes..... | Varennes. |
| The Abenakis Springs Co., Ltd. | Abenakis Springs, Que. | Yamaska, Que..... | Abenakis Springs. | Abenakis. |
| M. Timmons & Sons..... | Quebec, Que..... | ..... | ..... | ..... |
| Saugeen Mineral Water Company. | Southampton, Ont... | Bruce, Ont..... | Southampton. | Saugeen. |
| Thos. L. Boyd..... | Carlsbad Springs, Ont. | Carleton, Ont..... | ..... | Carlsbad. |
| Goderich Mineral Water Co.... | Goderich, Ont..... | Huron, Ont..... | ..... | Minisitung. |
| Dom. Springs Mineral Water... | Pakenham, Ont. R.R. No. 4. | Lanark, Ont..... | Pakenham,... | Dominion. |
| Sanitaris Limited..... | Arnprior, Ont..... | "..... | ..... | Sanitaris. |
| Arthur Belanger..... | Papineauville, Que... | Prescott, Ont..... | N. Plantaganet Tp. | St. George. |
| Allan's Limited..... | Montreal, 86 Dorchester W. | "..... | Caledonia.... | Caledonia. |
| Chas. Gurd & Co., Ltd..... | Montreal, 76 Bleury | "..... | "..... | Gurd's Caledonia. |
| Lyll, Trenholme & Macdonnell | Montreal West..... | "..... | "..... | Beaver. |
| A. Sabourin..... | Hawkesbury..... | "..... | "..... | Maple Leaf. |
| Red Arrow Caledonia Water Co., Ltd. | Montreal, 591 St. Catherine W. | "..... | Cal. Springs... | Magi. |
| F. Deneault..... | Bourget, Que..... | Russell, Ont..... | Bourget..... | Adanac. |
| The Can. Mineral Waters, Ltd. | Toronto, 65 Bellwood Ave. | "..... | "..... | Brook. |
| Stanley Mineral Springs Co., Ltd. | Winnipeg, 410 Builders Ex. | Thunder Bay Dist., Ont. | Stanley..... | Russell. |
| St. Davids Mt. Spring Water Co., Ltd. | St. Davids, Ont..... | Welland, Ont..... | St. Davids... | Lithia. |
| Halcyon Bottling Co..... | Halcyon, B.C..... | W. Kootenay Dist... | Halcyon..... | Stanley. |
| M. Grady..... | St. Leon Hot Springs, B.C. | "..... | St. Leon. | Halcyon. |
| F. F. Siemens..... | Rosthern, Sask..... | "..... | Hot Springs. | Lithia. |
| | | | Renata, B.C.... | St. Leon. |

NATURAL GAS.

The total value of the production of natural gas in 1914 reached the highest figure yet recorded, being slightly in excess of that of the 1913 production.

The 1914 production is reported as about 21,692,504 M cu. ft. valued at \$3,484,727 as compared with 20,477,838 M cu. ft. in 1913, and 15,286,803 M cu. ft. in 1912. Ontario in 1914 produced 14,094,521 M cu. ft., valued at \$2,215,808, Alberta 7,172,157 M cu. ft., valued at \$1,214,670, and New Brunswick 425,826 M cu. ft., valued at \$54,249. The production by provinces in 1913 was as follows: Ontario 12,474,745 M cu. ft., Alberta 7,174,490 M cu. ft., and New Brunswick 828,603 M cu. ft.

The value of the gas, as reported by the producers, varies from 5 cents to 30 cents per thousand feet, but these prices do not represent what the consumer has to pay. In some cases the producer also owns the distribution pipe line and receives the full price paid by the consumer. In other cases the producer may sell to a pipe line company who either sells directly to consumers, or may in turn re-sell to other pipe line companies for retail distribution; in such cases as these the producer receives only a fraction of the amount paid by the consumer, but he is saved the expense of distribution. The statistics given herewith represent, as far as possible, the value received by the producer, or owner, of the gas wells, whether such producer be the owner of the distribution line or not.

The petroleum and natural gas resources of Canada have been the subject of special investigation by the Mines Branch, Ottawa, and the first one of two volumes comprising the results of this investigation has recently been issued.¹

Statistics of the production of natural gas in 1913 and 1914, and of the value of the annual production since 1892 follow:—

Natural Gas Production, 1914.

| Province. | No. men. | Wages. | No. WELLS, 1914. | | | | PRODUCTION. | | |
|-----------------------|----------|---------|------------------|-----|-----|-----|-------------|-----------|----------|
| | | | (a) | (b) | (c) | (d) | M cub. ft. | Value. | Average. |
| | | | | | | | | \$ | cts. |
| Quebec..... | | | 2 | 1 | 0 | 0 | | | |
| New Brunswick..... | 5 | 5,825 | 23 | 2 | 3 | 0 | 425,826 | 54,249 | 13 |
| Ontario..... | 392 | 224,492 | 1,665 | 120 | 28 | 2 | 14,094,521 | 2,215,808 | 15½ |
| Saskatchewan..... | | | 0 | 1 | 1 | 3 | | | |
| Alberta..... | 164 | 243,976 | 64 | 10 | 1 | 4 | 7,172,157 | 1,214,670 | 17 |
| British Columbia..... | | | 0 | 0 | 0 | 1 | | | |
| Total..... | 561 | 474,293 | 1,754 | 134 | 33 | 10 | 21,692,504 | 3,484,727 | 16 |

(a) Total number of producing wells at end of year.

(b) Number of producing wells drilled during the year.

(c) Number of non-producing wells drilled during the year.

(d) Number of incomplete wells at end of the year.

¹ "Petroleum and Natural Gas Resources of Canada," F. G. Clapp, Mines Branch, Department of Mines, Can., No. 291, Vol. I.

Natural Gas Production, 1913.

| Province. | No. men. | Wages. | No. WELLS, 1913. | | | | PRODUCTION. | | |
|-----------------------|-------------|---------|------------------|-----|-----|-----|-------------|-----------|----------|
| | | | (a) | (b) | (c) | (d) | M cub. ft. | Value. | Average. |
| | | | | | | | | \$ | cts. |
| New Brunswick..... | 35 | 35,000 | 31 | 6 | 6 | 3 | 828,603 | †174,147 | 21 |
| Ontario..... | 336 | 237,600 | *1,605 | 211 | 49 | 14 | 12,474,745 | 2,055,768 | 16½ |
| Saskatchewan..... | | | 1 | | | 2 | | | |
| Alberta..... | 176 | 341,825 | 49 | 20 | 3 | 3 | 7,174,490 | 1,079,466 | 15 |
| British Columbia..... | | | 0 | 0 | 0 | 2 | | | |
| Total..... | 547 | 614,425 | *1,686 | 237 | 58 | 24 | 20,477,838 | 3,309,381 | 16 |

(a) Total number of producing wells at end of year.

(b) Number of producing wells drilled during the year.

(c) Number of non-producing wells drilled during the year.

(d) Number of incomplete wells at the end of the year.

* Includes 40 "shut in."

† This figure subsequently changed from \$174,147 to \$67,197.

Annual Production of Natural Gas.

| Calendar Year. | Value. | Calendar Year. | Value. |
|----------------|---------|----------------|-----------|
| | \$ | | \$ |
| 1892..... | 150,000 | 1903..... | 202,210 |
| 1893..... | 376,233 | 1904..... | 328,376 |
| 1894..... | 313,754 | 1905..... | 379,561 |
| 1895..... | 423,032 | 1906..... | 583,523 |
| 1896..... | 276,301 | 1907..... | 815,032 |
| 1897..... | 325,873 | 1908..... | 1,012,660 |
| 1898..... | 322,123 | 1909..... | 1,207,029 |
| 1899..... | 387,271 | 1910..... | 1,346,471 |
| 1900..... | 417,094 | 1911..... | 1,907,678 |
| 1901..... | 339,476 | 1912..... | 2,362,700 |
| 1902..... | 195,992 | 1913..... | 3,309,381 |
| | | 1914..... | 3,484,727 |

The number of producing wells in Canada at the end of the year was reported as 1,754 of which 134 were completed during the year. Non-producing wells to the number of 33 were drilled during the year, and 10 more under way were not finished on December 31st.

The Maritime Oil Fields, Limited, operating in Albert county, New Brunswick, had 23 wells producing at the end of the year, as contrasted with 31 on December 31, 1913. A number of the wells reported as producers in previous years were being drilled deeper in the hope of securing a larger flow of gas. The Company disposes of all its output to the Moncton Tramways Electricity and Gas Company for distribution in Moncton and Hillsborough.

In Ontario the number of producing wells at the close of the year was 1,665 as contrasted with 1,605 at the end of the previous year. The number of producing wells drilled during the year was 120; the number of non-producing ones was 28, and 2 were unfinished on December 31st.

As in other years almost the whole production of natural gas came from the Welland, the Haldimand-Norfolk, and the Essex-Kent fields. In Lambton county deep drilling for oil resulted in the discovery of gas at about 1,900 feet in depth, some of the wells producing record flows of gas for short intervals. Generally speaking the results of the gas flow from these wells were disappointing. The Fairbanks Estate and the Oil Springs Oil and Gas Company were the principal operators in this field. More detailed information about the drilling operations in Lambton may be found in a report of the Ontario Bureau of Mines¹. A well with a moderate flow of gas was reported from Delaware, Middlesex county.²

During 1913 the Southern Ontario Gas Company was organized with the object of distributing gas from the Kent field to the cities and towns dependent on the Haldimand-Norfolk field, the output of which field has not met the increased demands made upon it. A pipe line 153 miles long was constructed and gas from the Kent county field was distributed as far east as Hamilton in 1914.

To conserve the supply of Ontario natural gas the Ontario Legislature in 1907 passed an Act whereby the exportation of gas is prohibited, except under special license issued by the Lieutenant-Governor-in-Council. This Act was followed in 1908 by further legislation with the same object in view, viz: An "Act to prevent the wasting of natural gas, and to provide for the plugging of all abandoned wells," by which power was conferred on Inspectors appointed under the Act to enforce the stoppage of waste. Even more effective were the provisions of the Supplementary Revenue Act, 1907, by which a tax of 2 cents per thousand cu. ft. is leviable on all natural gas produced in the Province, 90 per cent of which tax is rebated on all gas used within the Province.

Natural gas production in Alberta in 1914 made no advance over 1913, probably because of the general lack of industrial activity. The production was 7,172,157 M cu. ft., valued at \$1,214,670 as compared with 7,174,490 M cu. ft. in 1913, valued at \$1,079,466. All the production comes from two fields, the Medicine Hat field, a producer since 1891, and the Bow Island field, the production of which was first commercially utilized in 1912. The latter field, by a pipe line 170 miles or more long, supplies Calgary, Lethbridge, McLeod, Granum, Claresholm, Nanton, High River, Okotoks, and other villages and towns in southern Alberta. In the drilling for oil near Calgary, and at other points in the Province, several wells have produced considerable flows of gas.³ In the Province there were on December 31st, sixty-four producing wells, of which ten had been drilled during the year; four others were not yet completed.

In Saskatchewan a small amount of drilling for gas was done, but with negative results.

¹ Ontario Bureau of Mines, Toronto, Can., Ann. Report, Vol. XXIII, Part 1, pp. 35, 237.

² Mine, Quarry and Derrick, March 31, 1915.

³ Geol. Survey, Can., Summary Report 1914, p. 51.

On Graham Island, B.C., the British Columbia Oilfields, Ltd., in drilling for oil struck a little gas.

Natural gas rights in Manitoba, Saskatchewan, Alberta, the Northwest Territories, and the Yukon, are the property of the Crown and their disposal is now subject to the regulations approved by Order-in-Council dated the 19th day of January, 1914.

These regulations provide for a rental of 25 cents an acre for the first year, and 50 cents an acre each subsequent year, lease to be for 21 years, renewable on conditions, and no applicant to be allowed to lease the gas rights under an area of more than 1,920 acres.

The full text of the regulations may be secured by applying to the Department of the Interior at Ottawa.

PEAT.

Only one peat bog was operated in 1914, viz: that of the Canadian Peat Company, (Head Office, Kent Bldg., Toronto) at Alfred, Prescott county, Ontario.

The shipments of peat during the year were 685 tons valued at \$2,470, as compared with a total of 2,600 tons valued at \$10,100 in 1913.

Statistics of the annual production of peat since 1900 are given in the following table:—

Annual Production of Peat.

| Calendar Year. | Tons. | Value. | Calendar Year. | Tons. | Value. |
|----------------|-------|--------|----------------|-------|--------|
| | | \$ | | | \$ |
| 1900..... | 400 | 1,200 | 1907..... | 50 | 200 |
| 1901..... | 220 | 600 | 1908..... | 60 | 180 |
| 1902..... | 475 | 1,663 | 1909..... | 60 | 240 |
| 1903..... | 1,100 | 3,300 | 1910..... | 841 | 2,604 |
| 1904..... | 800 | 2,400 | 1911..... | 1,463 | 3,817 |
| 1905..... | 80 | 260 | 1912..... | 700 | 2,900 |
| 1906..... | 474 | 1,422 | 1913..... | 2,600 | 10,100 |
| | | | 1914..... | 685 | 2,470 |

A number of publications on peat issued by the Mines Branch, Ottawa, are out of print, but copies of the following may be secured on application:—

Report No. 30. Investigation of the Peat Bogs and Peat Fuel Industry of Canada, 1908. Bulletin No. 1, by Erik Nystrom and A. Anrep.

Report No. 90. Reprint of Presidential Address delivered before the American Peat Society at Ottawa, July 25, 1910, by Eugene Haanel, Ph.D.

Report No. 151. Investigation of the Peat Bogs and the Peat Industry of Canada, 1910-1911. Bulletin No. 8, by A. Anrep.

Report No. 154. The Utilization of Peat Fuel for the Production of Power, being a record of experiments conducted at the Fuel Testing Station, Ottawa, 1910-1911. Report on—by B. F. Haanel, B.Sc.

Report No. 266. Investigation of the Peat Bogs and the Peat Industry, 1911-1912. Bulletin No. 9, by A. Anrep, Peat Expert.

Report No. 299. Peat, Lignite and Coal. Their value as Fuels for the Production of Gas and Power in the By-Product Recovery Producer. Report by B. F. Haanel, B.Sc.

PETROLEUM.

During recent years the production of crude petroleum has been regularly showing a decrease, and 1914 proved no exception, since the production was 5·8 per cent less than in 1913. The 1914 production was equivalent to only 27·2 per cent of the production of the banner year in the history of the industry, 1907, when the output was 788,872 barrels.

The 1914 production was 214,805 barrels (of 35 Imperial gallons) valued at \$343,124, as compared with a production in 1913 of 228,080 barrels, valued at \$406,439; in 1912, of 243,336 barrels, valued at \$345,050, and in 1911 of 291,092 barrels, valued at \$357,073. The average price per barrel realized in recent years has been as follows: \$1·597 in 1914, \$1·782 in 1913, \$1·418 in 1912, and \$1·225 in 1911.

The production of crude petroleum has come almost solely from Ontario, New Brunswick being the only other contributor prior to 1914, when a small production stated as 387 barrels was reported from one of the prospect wells in Alberta. The New Brunswick production has been as follows: 95 barrels in 1909, 1,485 barrels in 1910, 2,461 barrels in 1911, 2,679 barrels in 1912, 2,111 barrels in 1913, and 1,725 barrels in 1914. The 1914 production in Ontario was 212,693 barrels, valued at \$338,182. The New Brunswick production was valued at \$2,742, and that of Alberta at \$2,200.

In Ontario the production of crude oil is steadily but surely declining in spite of attempts being made by drilling to enlarge the areas of producing fields, or to find new ones. In the newer producing fields, as Dutton, Onondaga, and Tilbury, the decline is relatively rapid; in the older fields of Lambton and Bothwell, it is relatively slow.

New Brunswick petroleum production has been confined to Albert county where at present The Maritime Oil-Fields, Limited, are the only operators. The properties of this Company having developed a very considerable flow of gas the operators have recently been concentrating their energies on gas development. The oil production, never large, was smaller in 1914 than any year since 1910. New Brunswick possesses large deposits of bituminous shales richer in oil than the Scottish shales which have been exploited for many years at a profit.

Drilling near Calgary, Alberta, for oil continued briskly during the year, but the Calgary Petroleum Products Company was the only one of the explorers for oil which secured any quantity for sale. Drilling operations in this field were closely watched by the Geological Survey Branch, of the Department of Mines. Mr. Slipper, who had supervision of this work, reports, in part, as follows:—¹

¹ Geol. Sur. Can. Summary Report, 1914, p. 143.

"The MacDougall Segur Oil Company was the first to begin drilling operations. They 'spudded in' on section 16, township 21, range 3, west of the 5th meridian, in January, 1913. Soon afterward on January 25, well No. 1, of the Calgary Petroleum Products Company, was started near a gas spring on section 6, township 20, range 2, west of the 5th meridian. On October 6, 1913, at a depth of 1,556 feet the Calgary Petroleum Products Company penetrated an oil-bearing sandstone and a small quantity of a very light oil was obtained. This oil was cased off and drilling continued. Besides the oil several gas horizons were passed through. After this discovery other companies which had already been formed began drilling. The Black Diamond No. 1, Southern Alberta, Federal, Western Pacific, and United No. 1, were all drilling in the spring of 1914. On May 14, the Calgary Petroleum Products Company's well No. 1 encountered a second oil-bearing stratum at a depth of 2,718 feet. The second strike brought many other companies into the field and drilling became general over the greater part of the foothills region of southern Alberta. There were 44 drilling outfits which began to operate, but a number of these have ceased work.

"Cable tools, with the California type of standard rig, are in general use in the field. Diamond drills and a rotary type using a fish-tail bit or revolving steel disc cutters are also being operated. A pole-tool outfit was used by one of the companies for a time. Drilling is slow and difficult because most of the wells are boring through strata that are highly inclined and of varying hardness. Hence, crooked and badly caving holes are a continual source of trouble.

"The Calgary Petroleum Products Company's well No. 1, produces a light greenish-yellow oil. The following is the report of an analysis, made by E. Stansfield of the Mines Branch, Department of Mines, on a sample of crude oil from Dingman well No. 1. This report was furnished through the courtesy of Mr. A. W. Dingman, managing director:

"The oil was of a yellow colour, showed fluorescence, and was practically free from any sediment; it possessed a strong unpleasant odour.

"Specific gravity: by hydrometer at 60 degrees F. = 0.756.

Distillation Test.

| Degrees. | Per cent. by vol. | Specific gravity. | Colour of distillate. |
|--------------|----------------------|----------------------|--------------------------|
| 76—100..... | 14.4 | 0.702 | Yellow. |
| 100—120..... | 28.3 | 0.729 | Orange. |
| 120—140..... | 19.3 | 0.746 | " |
| 140—160..... | 11.3 | 0.760 | Yellow. |
| 160—180..... | 7.0 | 0.774 | Pale yellow. |
| 180—200..... | 4.3 | | |
| 200—220..... | 3.4 | | |
| 220—250..... | 2.8 | 0.791 | Almost colourless. |
| Residue..... | 6.6 | 0.874 | Dark brown. |
| Loss..... | 2.6 | | |
| | 100.0 | | |

Distillation began at 76 degrees C.

Specific gravity of the oil calculated from the above test equals 0.752; sulphur 0.10."

"This oil was obtained at a depth of 2,718 feet. The production has not been stated.

"The Moose Mountain well in section 34, township 23, range 5, west of the 5th meridian, obtained a small quantity of a dark green oil, which on analysis gives:—

| | |
|----------------------------|--------------|
| Gasoline..... | 20 per cent. |
| Kerosene..... | 50 " |
| Lubricating oil..... | 24 " |
| Solids (not analysed)..... | 6 " |

"Analysis by E. G. Voss, B.Sc.

"This oil comes from a depth of 1,690 feet. Several other wells in the district report small seepages of oil."

Prospecting for oil was prosecuted in other parts of Alberta, as well as near Calgary, and a review of these operations¹ states that samples of oil were secured from different localities in the northern part of the Province (where 13 oil or gas wells were being drilled²), one sample being a thick heavy oil from the "tar-sand" area north of Fort McKay; and in the south, too, in the Sweetgrass area, near the International Boundary some drilling was done, and, from the old Lineham well there, samples of a brown oil of 40° Beaumé gravity were secured.

In British Columbia drilling operations for petroleum were continued on Graham island. A geological investigation of this island was made by Mr. J. D. Mackenzie of the Geological Survey Branch in 1913 and 1914. Mr. Mackenzie, in a summary report on his field work³ says the chance that petroleum reservoirs may be found by drilling is extremely remote. The grounds for his conclusions are as follows:—

"There are four necessary geological features that an oil field must have in order to become productive. These are:—

1. A supply of liquid oil of sufficiently low viscosity to flow through the pores of cracks in an oil sand at the temperatures obtaining where the oil is found.

2. A container, porous in itself, as in the case of a sandstone, or made so by fracturing or other changes, as in a shale, limestone, chert, or dolomite. This container, irrespective of its real composition, is termed the "oil sand."

3. An impervious capping over the oil sand, imprisoning the oil until it is released by the drill. The capping is usually shale.

4. A rock structure favourable for the accumulation of the oil in reservoirs from which it may be obtained when they are tapped with a drill.

"Without going into the proofs here, it may be said that at no place on Graham island are all four of these conditions found together, and, so far as the writer could determine from a careful study, at no place are con-

¹ The Alberta Oil Fields, E. H. Cunningham Craig. The Can. Mg. Journal, Jan. 1, 1915, p. 26.

² See Map of Northern Alberta, No. 284, Mines Branch, Dept. of Mines, accompanying report on Bituminous Sands of Northern Alberta, S. C. Ellis, 1915, No. 281.

³ Geol. Sur., Can., Summary Report, 1914, p. 33.

bitions 1 and 4 fulfilled. For these reasons, then, the possibility that workable bodies of petroleum may be found on Graham island is regarded as very remote."

Drilling at Port Haney, not far from Vancouver, for oil has given only disappointing results.¹

The statistics of production of petroleum during recent years are compiled from the records of the Department of Trade and Commerce, as being the most accurate basis available. These figures are secured in connexion with the payment of a bounty of $1\frac{1}{2}$ cent per gallon by the Dominion Government on all crude oil produced from wells, or oil-shales, in Canada, the claim for bounties having to be substantiated as to quantity by the certificate of the receiving stations, tank companies, refiners, or other purchasers, as well as by the supervising officers on bounties.

Statistics of production of crude oil from 1881, in barrels of 35 gallons each, with the total value, and average price per barrel, are given in the following table.

Annual Production of Crude Petroleum.

| Year. | Barrels of 35 gallons. | Value. | Average. | Year. | Barrels of 35 gallons. | Value. | Average. |
|-----------|---------------------------|-----------|----------|-----------|---------------------------|-----------|----------|
| | | \$ | \$ cts. | | | \$ | \$ cts. |
| 1881..... | 368,987 | ..... | ..... | 1898..... | 758,391 | 1,061,747 | 1.400 |
| 1882..... | 389,573 | ..... | ..... | 1899..... | 808,570 | 1,202,020 | 1.484 |
| 1883..... | 472,866 | ..... | ..... | 1900..... | 710,498 | 1,151,007 | 1.620 |
| 1884..... | 571,000 | ..... | ..... | 1901..... | 622,392 | 1,008,275 | 1.620 |
| 1885..... | 587,563 | ..... | ..... | 1902..... | 530,624 | 951,190 | 1.792 |
| 1886..... | 584,061 | 525,655 | 0.90 | 1903..... | 486,637 | 1,048,974 | 2.155 |
| 1887..... | 713,728 | 556,708 | 0.78 | 1904..... | 503,474 | 935,895 | 1.858 |
| 1888..... | 695,203 | 713,695 | 1.02 | 1905..... | 634,095 | 856,028 | 1.350 |
| 1889..... | 704,690 | 653,600 | 0.92 | 1906..... | 569,753 | 761,760 | 1.337 |
| 1890..... | 795,030 | 902,734 | 1.18 | 1907..... | 788,872 | 1,057,088 | 1.340 |
| 1891..... | 755,298 | 1,010,211 | 1.33 | 1908..... | 527,987 | 747,102 | 1.415 |
| 1892..... | 779,753 | 984,438 | 1.26 | 1909..... | 420,755 | 559,604 | 1.330 |
| 1893..... | 798,406 | 874,255 | 1.09 | 1910..... | 315,895 | 388,550 | 1.230 |
| 1894..... | 829,104 | 835,322 | 1.00 | 1911..... | 291,092 | 357,073 | 1.225 |
| 1895..... | 726,138 | 1,086,738 | 1.49 | 1912..... | 243,336 | 345,050 | 1.418 |
| 1896..... | 726,822 | 1,155,647 | 1.59 | 1913..... | 228,080 | 406,439 | 1.782 |
| 1897..... | 709,857 | 1,011,546 | 1.42 | 1914..... | 214,805 | 343,124 | 1.597 |

The following table gives statistics of the bounties paid to date by the Dominion Government on production of crude oil in Canada, from wells or oil shales, the bounty being $1\frac{1}{2}$ cent per gallon.

Record of Bounty Paid by Dominion Government on Production of Crude Petroleum.

| Calendar Year. | Bounty Paid. | Calendar Year. | Bounty Paid. |
|----------------|--------------|----------------|--------------|
| | \$ | | \$ |
| 1905..... | 332,900 | 1910..... | 165,845 |
| 1906..... | 299,120 | 1911..... | 152,823 |
| 1907..... | 414,158 | 1912..... | 127,751 |
| 1908..... | 277,193 | 1913..... | 119,742 |
| 1909..... | 220,897 | 1914..... | 112,569 |

¹ "Drilling for Oil at Port Haney." Report of Minister of Mines, British Columbia, 1914, p. 392.

The production of crude oil in the Province of Ontario, by districts, since 1910, is shown in the following table. The record has been furnished by the Supervisor of Petroleum Bounties at Petrolia, and agrees very closely, although not identically, with the statistics of the Department of Trade and Commerce used in compiling the record of production for the whole of Canada.

Production of Crude Petroleum in Ontario by Districts.

| Field. | 1910. | 1911. | 1912. | 1913. | 1914. |
|------------------------------|---------|---------|---------|---------|---------|
| | Bls. | Bls. | Bls. | Bls. | Bls. |
| Lambton..... | 205,456 | 184,450 | 150,272 | 155,747 | 154,186 |
| Tilbury and Romney..... | 63,058 | 48,707 | 44,727 | 26,824 | 18,530 |
| Bothwell..... | 36,998 | 35,244 | 34,486 | 34,348 | 33,961 |
| Leamington..... | 141 | | | | |
| Dutton..... | 7,752 | 6,732 | 4,335 | 4,610 | 2,190 |
| Onondaga (Brant county)..... | 1,005 | 13,501 | 7,115 | 4,172 | 2,437 |
| Belle River..... | | | | 464 | 1,191 |
| Total..... | 314,410 | 288,634 | 240,935 | 226,165 | 212,495 |

Inspection of Petroleum.

At present there are five oil refineries in Canada: one at Sarnia, Ontario, and one at Ioco, British Columbia (near Vancouver), both owned by the Imperial Oil Company, of Sarnia, Ontario; one at Petrolia, Ontario, owned by the Canadian Oil Company of Toronto, Canada; one at Wallaceburg, Ontario, owned by the Empire Refining Company; and one at Toronto owned by the British American Oil Company. At each of these refineries considerable quantities of imported crude oil are handled. Domestic crude oil is refined chiefly by the Imperial Oil Company and occasionally by some of the other refineries.

All refined illuminating oils and naphtha manufactured and shipped from Canadian refineries are inspected by the Department of Inland Revenue. The total quantity inspected for the fiscal year ending March 31, 1915, was 46,382,785·09 gallons as compared with 33,602,017·27 gallons the previous year. There are four inspection districts known respectively as the London, Toronto, Windsor, and Vancouver districts, the first mentioned covering the refineries at Sarnia and Petrolia, Ontario, the second the Toronto refinery, the third the Wallaceburg refinery, and the fourth the recently opened refinery of the Imperial Oil Company at Ioco on Burrard Inlet, near Vancouver, British Columbia.

The following tables, showing the quantities of refined illuminating oils and naphtha inspected in the several districts, are quoted from the annual report of the Department of Inland Revenue.

Return of Inspected Petroleum and Naphtha Shipped from Refineries During the Fiscal Year Ending March 31, 1915.

| Divisions. | Petroleum. | Naphtha. | Total. |
|---------------------|---------------|---------------|---------------|
| | Gals. | Gals. | Gals. |
| London, Ont..... | 28,937,088·18 | 12,317,387·61 | 41,254,475·79 |
| Toronto, Ont..... | 2,008,089·00 | 2,932,217·00 | 4,940,306·00 |
| Windsor, Ont..... | 3,591·90 | 15,775·40 | 19,367·30 |
| Vancouver, B.C..... | 168,636·00 | Nil. | 168,636·00 |
| | 31,117,405·08 | 15,265,380·01 | 46,382,785·09 |

Comparative Statement of Inspected Petroleum and Naphtha Shipped from Canadian Refineries During the Fiscal Years Ending March 31, 1910-1915.

| Fiscal Year. | Petroleum. | Naphtha. | Total. |
|--------------|---------------|---------------|----------------|
| 1910..... | 19,100,424·16 | 4,113,149·46 | *23,213,573·62 |
| 1911..... | 21,017,628·45 | 6,517,655·41 | *27,535,283·86 |
| 1912..... | 20,886,072·43 | 5,577,591·62 | *26,463,664·05 |
| 1913..... | 22,485,437·34 | 6,880,761·85 | *29,366,199·19 |
| 1914..... | 22,986,328·66 | 10,615,688·61 | *33,602,017·27 |
| 1915..... | 31,117,405·08 | 15,265,380·01 | 46,382,785·09 |

* All from Ontario Refineries.

EXPORTS OF PETROLEUM.

The exports of crude oil from Canada are comparatively small, the available statistics being shown in the next table following. During 1914 the exports, as published by the Customs Department, included, crude oil 3,996 gallons valued at \$362, refined oils 3,922 gallons valued at \$826, naphtha and gasoline 43,023 gallons valued at \$11,607, or a total of 50,941 gallons valued at \$12,795. There was also an export of 455,867 gallons valued at \$104,179 of "other oils n.e.s." which probably included products of petroleum.

Exports of Crude and Refined Petroleum.

| Calendar Year. | CRUDE OIL. | | REFINED OIL. | | TOTAL. | |
|----------------|------------|--------|--------------|--------|-----------|--------|
| | Gals. | Value. | Gals. | Value. | Gals. | Value. |
| | | \$ | | \$ | | \$ |
| 1881..... | | | | | 501 | 99 |
| 1882..... | | | | | 1,119 | 286 |
| 1883..... | | | | | 13,283 | 710 |
| 1884..... | | | | | 1,098,090 | 30,168 |
| 1885..... | | | | | 337,967 | 10,562 |
| 1886..... | | | | | 241,716 | 9,855 |
| 1887..... | | | | | 473,559 | 13,831 |
| 1888..... | | | | | 196,602 | 74,542 |
| 1889..... | | | | | 235,855 | 10,777 |
| 1890..... | | | | | 420,492 | 18,154 |
| 1891..... | 446,770 | 18,471 | 585 | 104 | 447,355 | 18,575 |
| 1892..... | 310,387 | 12,945 | 1,146 | 100 | 311,533 | 13,045 |
| 1893..... | 107,719 | 3,696 | 2,196 | 394 | 109,915 | 4,090 |
| 1894..... | 53,985 | 2,773 | 5,297 | 513 | 59,282 | 3,286 |
| 1895..... | 22,831 | 1,044 | 10,237 | 2,023 | 33,068 | 3,067 |
| 1896..... | 601 | 101 | 7,489 | 999 | 8,090 | 1,100 |
| 1897..... | | | 342 | 49 | 342 | 49 |
| 1898..... | 96 | 4 | 12,735 | 3,001 | 12,831 | 3,005 |
| 1899..... | | | 3,425 | 859 | 3,425 | 859 |
| 1900..... | 40 | 2 | 8,559 | 2,394 | 8,599 | 2,396 |
| 1901..... | 14,168 | 691 | 375 | 66 | 14,543 | 757 |
| 1902..... | 400 | 40 | 626 | 146 | 1,026 | 186 |
| 1903..... | 350 | 15 | 1,013 | 190 | 1,363 | 205 |
| 1904..... | 4,207 | 213 | 2,126 | 470 | 6,333 | 683 |
| 1905..... | 35 | 2 | 7,228 | 2,078 | 7,263 | 2,080 |
| 1906..... | 900 | 141 | 8,938 | 1,401 | 9,838 | 1,542 |
| 1907..... | 1,125 | 102 | 3,132 | 575 | 4,257 | 677 |
| 1908..... | | | 296 | 71 | 296 | 71 |
| 1909..... | | | 7,768 | 934 | 7,768 | 934 |
| 1910..... | | | 2,818 | 462 | 2,818 | 462 |
| 1911..... | | | 24,448 | 4,500 | 24,448 | 4,500 |
| 1912..... | 18,500 | 3,964 | 62,736 | 10,408 | 81,236 | 14,372 |
| 1913..... | 3,650 | 379 | *42,148 | 7,472 | 45,798 | 7,851 |
| 1914..... | 3,996 | 362 | *46,945 | 12,433 | 50,941 | 12,795 |

*Includes naphtha and gasoline.

IMPORTS OF PETROLEUM.

The imports of petroleum and petroleum products into Canada have been rapidly increasing, while the domestic production has been decreasing. The imports during the calendar year 1914 totalled 244,487,973 gallons of petroleum, crude and refined, valued at \$11,072,362, while in 1913 they were 222,779,028 gallons, valued at \$13,238,429. The simultaneous occurrence of a large increase in total quantity and a substantial decrease in total value is explained by the fact that there was a thirty-three-million gallon increase in imports of crude fuel and gas oils, with an increase of only about \$500,000 over the value of similar imports in the previous year, while in all varieties of refined petroleum there was a decrease in quantity of about 19 per cent.

Imports of paraffin wax and paraffin wax candles in 1914 totalled 1,594,236 pounds, valued at \$102,401, as compared with imports in 1913 of 1,628,837 pounds, valued at \$109,897.

The oil imports included: crude oil 195,207,210 gallons, valued at \$5,750,971, (items (a) and (b) in table below); refined and illuminating oils 12,833,065 gallons valued at \$970,481, (items (c) and (d) in table below); gasoline 24,396,401 gallons valued at \$2,747,360; lubricating oils 5,767,676 gallons valued at \$940,143, (items (e) and (g) in table below); and other oils, products of petroleum, 6,283,621 gallons, valued at \$663,407. On comparison with 1913 imports it is seen that imports of crude oil showed an increase of 20·4 per cent, imports of refined illuminating oils a decrease of 33·7 per cent, imports of gasoline a decrease of 17·3 per cent, imports of lubricating oils a decrease of 15·0 per cent, and imports of other oils, products of petroleum, an increase of 25·4 per cent.

In British Columbia, particularly, the use of crude oil for fuel is increasing rapidly, the imports of crude oil into that Province for the past few years having been as follows: For the fiscal year ending March 31, 1913, 80,234,743 gallons valued at \$1,443,789; for the fiscal year ending March 31, 1914, 110,585,434 gallons, valued at \$2,282,299, and for the fiscal year ending March 31, 1915, 110,641,693 gallons, valued at \$2,174,634.

Details of imports of petroleum and petroleum products during the calendar years 1913 and 1914 are given in the following table:—

Imports of Petroleum and Petroleum Products During the Calendar Years 1913 and 1914.

| Products. | 1913. | | 1914. | |
|--|-------------|--------------|-------------|--------------|
| | Gals. | Value. | Gals. | Value. |
| (a) Petroleum crude, fuel and gas oils (0·8235 specific gravity or heavier)..... | 162,023,842 | \$ 5,246,526 | 195,152,861 | \$ 5,746,107 |
| (b) Crude petroleum, gas oils (other than benzene, naphtha and gasoline)..... | 38,084 | 4,309 | 54,349 | 4,864 |
| (c) Coal and kerosene, distilled, purified, or refined..... | 19,225,528 | 1,327,647 | 12,670,085 | 905,124 |
| (d) Illuminating oils composed wholly or in part of the products of petroleum, coal, shale or lignite, costing more than 30 cents per gallon.. | 168,099 | 66,793 | 162,980 | 65,357 |
| (e) Lubricating oils composed wholly or in part of petroleum, costing less than 25 cents per gallon | 5,620,697 | 779,789 | 4,775,154 | 629,311 |
| (f) Products of petroleum, n.o.p..... | 5,008,844 | 597,227 | 6,283,621 | 663,407 |
| (g) Lubricating oils, n.o.p..... | 1,168,754 | 393,197 | 992,522 | 310,832 |
| (h) Gasoline..... | 29,525,180 | 4,822,941 | 24,396,401 | 2,747,360 |
| Total..... | 222,779,028 | 13,238,429 | 244,487,973 | 11,072,362 |
| Paraffin wax..... | | 72,351 | | 57,527 |
| Paraffin wax candles..... | | 37,546 | | 44,874 |
| Total..... | | 13,348,326 | | 11,174,763 |

The total annual imports of petroleum and petroleum products are shown in the three tables following. The first table gives imports of petroleum, crude and refined; the second imports of paraffin wax; and the third imports of paraffin wax candles.

Imports of Crude and Refined Petroleum.

| Fiscal Year. | Gals. | Value. | Fiscal Year. | Gals. | Value. |
|--------------|-----------|---------|--------------------|-------------|------------|
| | | \$ | | | \$ |
| 1880..... | 687,641 | 131,359 | 1898..... | 9,074,311 | 724,519 |
| 1881..... | 1,437,475 | 262,168 | 1899..... | 10,394,208 | 763,303 |
| 1882..... | 3,007,702 | 398,031 | 1900..... | 9,633,647 | 864,833 |
| 1883..... | 3,086,316 | 358,546 | 1901..... | 11,082,822 | 982,640 |
| 1884..... | 3,160,282 | 380,082 | 1902..... | 13,220,005 | 1,107,207 |
| 1885..... | 3,767,441 | 415,195 | 1903..... | 18,799,312 | 1,643,371 |
| 1886..... | 3,819,146 | 421,836 | 1904..... | 24,521,115 | 2,152,623 |
| 1887..... | 4,290,003 | 467,003 | 1905..... | 35,296,332 | 2,151,514 |
| 1888..... | 4,523,056 | 408,025 | 1906..... | 32,624,410 | 1,908,177 |
| 1889..... | 4,650,274 | 484,462 | 1907 (9 mos.)..... | 23,645,861 | 1,480,261 |
| 1890..... | 5,075,650 | 515,852 | 1908..... | 40,213,542 | 2,577,059 |
| 1891..... | 5,071,386 | 498,330 | 1909..... | 51,700,476 | 3,219,243 |
| 1892..... | 5,649,145 | 475,732 | Calendar Year. | | |
| 1893..... | 6,002,141 | 446,389 | 1910..... | 84,629,334 | 4,826,763 |
| 1894..... | 6,597,108 | 439,988 | 1911..... | 116,892,689 | 6,009,730 |
| 1895..... | 7,577,674 | 525,372 | 1912..... | 186,787,484 | 11,858,533 |
| 1896..... | 8,005,891 | 735,913 | 1913..... | 222,779,028 | 13,238,429 |
| 1897..... | 8,415,302 | 697,169 | 1914..... | 244,487,973 | 11,072,362 |

Imports of Paraffin Wax.

| Fiscal Year. | Lbs. | Value. | Fiscal Year. | Lbs. | Value. |
|--------------|---------|--------|--------------------|-----------|--------|
| | | \$ | | | \$ |
| 1883..... | 43,716 | 5,166 | 1900..... | 47,400 | 3,529 |
| 1884..... | 39,010 | 6,079 | 1901..... | 118,848 | 9,639 |
| 1885..... | 59,967 | 8,123 | 1902..... | 225,885 | 12,750 |
| 1886..... | 62,035 | 7,953 | 1903..... | 592,642 | 28,674 |
| 1887..... | 61,132 | 6,796 | 1904..... | 418,967 | 18,440 |
| 1888..... | 53,862 | 4,930 | 1905..... | 81,992 | 7,795 |
| 1889..... | 63,229 | 5,250 | 1906..... | 112,612 | 9,721 |
| 1890..... | 239,229 | 15,844 | 1907 (9 mos.)..... | 55,021 | 5,922 |
| 1891..... | 753,854 | 50,275 | 1908..... | 62,308 | 8,041 |
| 1892..... | 733,873 | 48,776 | 1909..... | 129,631 | 12,795 |
| 1893..... | 452,916 | 38,935 | Calendar Year. | | |
| 1894..... | 208,099 | 15,704 | 1910..... | 1,192,616 | 58,673 |
| 1895..... | 163,817 | 11,579 | 1911..... | 1,688,216 | 75,661 |
| 1896..... | 150,287 | 10,042 | 1912..... | 1,901,586 | 85,491 |
| 1897..... | 138,703 | 7,945 | 1913..... | 1,291,615 | 72,351 |
| 1898..... | 103,570 | 5,987 | 1914..... | 1,218,969 | 57,527 |
| 1899..... | 92,242 | 4,025 | | | |

Imports of Paraffin Wax Candles.

| Fiscal Year. | Lbs. | Value. | Fiscal Year. | Lbs. | Value. |
|--------------|--------|--------|--------------------|---------|--------|
| | | \$ | | | \$ |
| 1880..... | 10,445 | 2,269 | 1898..... | 60,802 | 4,427 |
| 1881..... | 7,494 | 1,683 | 1899..... | 62,331 | 5,856 |
| 1882..... | 5,818 | 1,428 | 1900..... | 27,663 | 3,671 |
| 1883..... | 7,149 | 1,734 | 1901..... | 44,562 | 3,588 |
| 1884..... | 8,755 | 2,229 | 1902..... | 51,120 | 5,752 |
| 1885..... | 9,247 | 2,449 | 1903..... | 83,377 | 9,025 |
| 1886..... | 12,242 | 2,587 | 1904..... | 83,471 | 9,078 |
| 1887..... | 21,364 | 3,611 | 1905..... | 137,353 | 15,293 |
| 1888..... | 22,054 | 2,829 | 1906..... | 148,808 | 15,804 |
| 1889..... | 8,038 | 1,337 | 1907 (9 mos.)..... | 38,900 | 5,088 |
| 1890..... | 7,233 | 1,186 | 1908..... | 156,934 | 20,035 |
| 1891..... | 10,598 | 2,116 | 1909..... | 110,848 | 14,806 |
| 1892..... | 9,259 | 1,952 | Calendar Year. | | |
| 1893..... | 8,351 | 1,735 | 1910..... | 169,619 | 21,433 |
| 1894..... | 10,818 | 1,685 | 1911..... | 271,571 | 30,763 |
| 1895..... | 19,448 | 2,541 | 1912..... | 242,420 | 34,029 |
| 1896..... | 25,787 | 4,072 | 1913..... | 337,222 | 37,546 |
| 1897..... | 25,114 | 2,929 | 1914..... | 375,267 | 44,874 |

PETROLEUM REGULATIONS

The regulations under which petroleum and natural gas rights on Dominion lands may be secured were revised in January, 1914. The full text of the regulations, which are briefly outlined herewith, may be obtained from the Mining Lands and Yukon Branch of the Department of the Interior. They are entitled "Regulations for the disposal of petroleum and natural gas rights, the property of the Crown in Manitoba, Saskatchewan, Alberta, the Northwest Territories, the Yukon Territory, the Railway Belt in the Province of British Columbia, and within the tract containing three and one-half ($3\frac{1}{2}$) million acres of land acquired by the Dominion Government, and referred to in sub-section 6 of section 3 of the Dominion Lands Act." Approved by Order-in-Council dated the 19th day of January, 1914.

These regulations provide for the leasing of petroleum and natural gas rights under an area of not more than 1,920 acres to one applicant for a period of twenty-one (21) years, subject to a rental of twenty-five (25) cents an acre for the first year, and fifty (50) cents an acre for each subsequent year.

The lessee is required to have upon the lands leased, within one year of the date of the lease, such machinery as the Minister may consider necessary for the carrying on of prospecting operations, and is required to begin boring operations within fifteen months of the date of the lease, which shall be continued with reasonable diligence, with a view to the discovery of oil or natural gas.

The lessee is required to prevent the injurious access of water to the oil-bearing formation, and should gas be discovered, must take all reasonable and proper precautions to prevent the waste of natural gas.

Provision is made in the regulations that on or after January 1, 1930, a royalty may be charged on the petroleum products from locations leased under these regulations, and that at any time a royalty may be levied on the natural gas products of the leasehold.

Any company acquiring, by assignment or otherwise, a lease shall at all times be and remain a British company registered in Great Britain or Canada.

PHOSPHATE.

The small production of phosphate or apatite, which has been obtained in Canada since 1896, has been produced almost altogether as a by-product in connexion with the mining of mica. Shipments during 1914 totalled 954 tons valued at \$7,275 as compared with 385 tons valued at \$3,643 in 1913. The output during 1914 was derived from the Little Rapids Mine, Portland East, and the Blackburn Mine in West Templeton, Que., and a mine in North Burgess, Lanark county, Ontario, and was marketed in Buckingham, Que., Smiths Falls, Ont., and N. Paterson, N. J.

Phosphate is used at Buckingham, Que., in the manufacture of fertilizers, phosphorus, and ferro-phosphorus, and the main supply is now imported from Florida.

For a number of years previous to 1892, there was a considerable production of apatite from the district north of Buckingham, the annual output varying from 20,000 tons to 30,000 tons. The introduction of the cheaply-mined phosphates of the southern states, however, resulted in the collapse of the Canadian industry, though it was claimed at the time of closing down that there was no diminution in the available supply of mineral.

Statistics of production and exports are shown in tables following:—

Annual Production of Phosphate.

| Calendar Year. | Tons. | Value. | Average value per ton. | Calendar Year. | Tons. | Value. | Average value per ton. |
|----------------|--------|---------|------------------------|----------------|-------|--------|------------------------|
| | | \$ | \$ cts. | | | \$ | \$ cts. |
| 1886..... | 20,495 | 304,338 | 14 85 | 1900..... | 1,415 | 7,105 | 5 02 |
| 1887..... | 23,690 | 319,815 | 13 50 | 1901..... | 1,033 | 6,280 | 6 07 |
| 1888..... | 22,485 | 242,285 | 10 77 | 1902..... | 856 | 4,953 | 5 79 |
| 1889..... | 30,988 | 316,662 | 10 21 | 1903..... | 1,329 | 8,214 | 6 18 |
| 1890..... | 31,753 | 361,045 | 11 37 | 1904..... | 817 | 4,590 | 5 62 |
| 1891..... | 23,588 | 241,603 | 10 24 | 1905..... | 1,300 | 8,425 | 6 48 |
| 1892..... | 11,932 | 157,424 | 13 20 | 1906..... | 850 | 6,375 | 7 50 |
| 1893..... | 8,198 | 70,942 | 8 65 | 1907..... | 824 | 6,018 | 7 30 |
| 1894..... | 6,861 | 41,166 | 6 00 | 1908..... | 1,596 | 14,794 | 9 26 |
| 1895..... | 1,822 | 9,565 | 5 25 | 1909..... | 998 | 8,054 | 8 07 |
| 1896..... | 570 | 3,420 | 6 00 | 1910..... | 1,478 | 12,578 | 8 51 |
| 1897..... | 908 | 3,984 | 4 39 | 1911..... | 621 | 5,206 | 8 38 |
| 1898..... | 733 | 3,665 | 5 00 | 1912..... | 164 | 1,640 | 10 00 |
| 1899..... | 3,000 | 18,000 | 6 00 | 1913..... | 385 | 3,643 | 9 46 |
| | | | | 1914..... | 954 | 7,275 | 7 63 |

Exports of phosphate in 1914 are reported by the Department of Customs as 247 tons valued at \$677.

The imports of phosphate rock (fertilizer) during 1914 were valued at \$20,220; acid phosphate (not medicinal) 1,874,486 pounds valued at \$97,862; and phosphorus 20,994 pounds valued at \$6,760.

The imports of phosphate rock (fertilizer) for 1913 were valued at \$16,070; acid phosphate (not medicinal) 1,987,775 pounds valued at \$89,543; and phosphorus, 17,600 pounds, valued at \$5,856.

Phosphorus is manufactured at Buckingham by the Electric Reduction Company. The exports of phosphorus during the twelve months ending December 31, 1914 were 610,350 pounds, valued at \$92,303 as compared with 534,340 pounds, valued at \$73,395 in 1913; 543,620 pounds, valued at \$66,806 in 1912; and 524,370 pounds, valued at \$76,608 in 1911.

Exports of Phosphate.

| Calendar Year. | ONTARIO. | | QUEBEC. | | TOTAL. | |
|----------------|----------|---------|---------|---------|--------|---------|
| | Tons. | *Value. | Tons. | *Value. | Tons. | *Value. |
| | | \$ | | \$ | | \$ |
| 1878..... | 824 | 12,278 | 9,919 | 195,831 | 10,743 | 208,109 |
| 1879..... | 1,842 | 20,565 | 6,604 | 101,470 | 8,446 | 122,035 |
| 1880..... | 1,387 | 14,422 | 11,673 | 175,664 | 13,060 | 190,086 |
| 1881..... | 2,471 | 36,117 | 9,497 | 182,339 | 11,968 | 218,456 |
| 1882..... | 568 | 6,338 | 16,585 | 302,019 | 17,153 | 308,357 |
| 1883..... | 50 | 500 | 19,666 | 427,168 | 19,716 | 427,668 |
| 1884..... | 763 | 8,890 | 20,946 | 415,350 | 21,709 | 424,240 |
| 1885..... | 434 | 5,962 | 28,535 | 490,331 | 28,969 | 496,293 |
| 1886..... | 644 | 5,816 | 19,796 | 337,191 | 20,440 | 343,007 |
| 1887..... | 705 | 8,277 | 22,447 | 424,940 | 23,152 | 433,217 |
| 1888..... | 2,643 | 30,247 | 16,133 | 268,362 | 18,776 | 298,609 |
| 1889..... | 3,547 | 38,833 | 26,440 | 355,935 | 29,987 | 394,768 |
| 1890..... | 1,866 | 21,329 | 26,591 | 478,040 | 28,457 | 499,369 |
| 1891..... | 1,551 | 16,646 | 15,720 | 368,015 | 17,271 | 384,661 |
| 1892..... | 1,501 | 12,544 | 9,981 | 141,221 | 11,482 | 153,765 |
| 1893..... | 1,990 | 11,550 | 5,748 | 56,402 | 7,738 | 67,952 |
| 1894..... | 1,980 | 10,560 | 3,470 | 29,610 | 5,450 | 40,170 |
| 1895..... | | | 250 | 2,500 | 250 | 2,500 |
| 1896..... | 1 | 5 | 299 | 2,990 | 300 | 2,995 |
| 1897..... | 70 | 450 | 165 | 400 | 235 | 850 |
| 1898..... | 21 | 240 | 702 | 8,000 | 723 | 8,240 |
| 1899..... | 215 | 1,850 | 93 | 1,725 | 308 | 3,575 |
| 1900..... | | | | | Nil. | Nil. |
| 1901..... | | | | | 6 | 120 |
| 1902..... | | | | | 70 | 1,880 |
| 1903..... | | | | | 1 | 20 |
| 1904..... | | | | | 191 | 5,348 |
| 1905..... | | | | | 40 | 1,253 |
| 1906..... | | | | | | |
| 1907..... | | | | | | |
| 1908..... | | | | | 1 | 30 |
| 1909..... | | | | | 895 | 15,735 |
| 1910..... | | | | | | |
| 1911..... | | | | | 3 | 100 |
| 1912..... | | | | | | |
| 1913..... | | | | | | |
| 1914..... | | | | | 247 | 677 |

* These values do not compare with those in Table of Annual Production; the spot value is adopted for the production, while the exports are valued upon quite a different basis.

Exports of Phosphorus.

| Calendar Year. | Pounds. | Value. |
|----------------|---------|-----------|
| 1911..... | 524,370 | \$ 76,608 |
| 1912..... | 543,620 | 66,806 |
| 1913..... | 534,340 | 73,395 |
| 1914..... | 610,350 | 92,303 |

Imports of Acid Phosphate and Phosphorus.

| Calendar Year. | Phosphate rock (fertilizer) | Acid phosphate. | | Phosphorus. | |
|----------------|-----------------------------------|-----------------|--------|-------------|--------|
| | | Lbs. | Value. | Lbs. | Value. |
| | \$ | | \$ | | \$ |
| 1910..... | 72,950 | 1,379,173 | 55,999 | 6,752 | 2,065 |
| 1911..... | 46,217 | 1,334,643 | 60,882 | 14,818 | 4,384 |
| 1912..... | 24,586 | 1,379,173 | 55,999 | 13,807 | 4,012 |
| 1913..... | 16,070 | 1,987,775 | 89,543 | 17,600 | 5,856 |
| 1914..... | 20,226 | 1,874,486 | 97,862 | 20,994 | 6,760 |

PYRITES.

Pyrites ores are mined in the Province of Quebec at the Eustis mine, Eustis, the Weedon mine, the Stratford prospect in Stratford township, and the Ives mine at Eastman. The shipping mines in Ontario were those at Sulphide and Queensboro in Hastings county, the Helen mine and Goudreau properties in Michipicoten, Algoma dist., and Northpines, Vermillion lake, Kenora dist.

The total shipments in 1914 were 228,314 tons, valued at \$744,508 and included 117,698 tons valued at \$470,792 from Quebec and 110,616 tons valued at \$273,716 from Ontario mines.

The total shipments in 1913 were 158,566 tons, valued at \$521,181 which included 87,314 tons, valued at \$349,256 from Quebec and 71,252 tons, valued at \$171,925 from Ontario. The pyrites ores of the Eastern Townships of Quebec are cupriferous, the copper content of the shipping ores averaging about 2.75 per cent; they also carry small quantities of gold and silver.

The exports of pyrites from Canada in 1914 as reported by the Customs Department were 89,999 tons valued at \$377,985, as compared with 46,066 tons valued at \$211,640 exported in 1913 and 5,938 tons valued at \$11,935 exported in 1912. Direct returns from operators, however, appear to indicate larger exports than is shown by this record and it is possible that some of the ore may be exported as "copper ore" and not as pyrites.

The imports of brimstone and crude sulphur during the calendar year 1914 were 41,954 tons, valued at \$870,868, as against 30,433 tons, valued at \$633,114, in 1913, and 38,647 tons valued at \$806,690 in 1912.

No record is available of the quantity of sulphuric acid manufactured in Canadian plants. The imports of sulphuric acid during the calendar year 1914, according to Customs returns, were 332,274 pounds, valued at \$7,149, as compared with imports in 1913 of 145,074 pounds, valued at \$4,054 and 4,971,446 pounds, valued at \$35,325 in 1912.

Statistics of production and exports of pyrites, of imports of brimstone and crude sulphur, and of imports of sulphuric acid, are shown in the following tables:—

Annual Production of Pyrites.

| Calendar Year. | Tons. | Value. | Calendar Year. | Tons | Value. |
|----------------|--------|---------|----------------|---------|---------|
| | | \$ | | | \$ |
| 1886..... | 42,906 | 193,077 | 1900..... | 40,031 | 155,164 |
| 1887..... | 38,043 | 171,194 | 1901..... | 35,261 | 130,544 |
| 1888..... | 63,479 | 285,656 | 1902..... | 35,616 | 138,939 |
| 1889..... | 72,225 | 307,292 | 1903..... | 33,982 | 127,713 |
| 1890..... | 49,227 | 123,067 | 1904..... | 37,180 | 134,033 |
| 1891..... | 67,731 | 203,193 | 1905..... | 33,339 | 125,486 |
| 1892..... | 59,770 | 179,310 | 1906..... | 42,743 | 169,990 |
| 1893..... | 58,542 | 175,626 | 1907..... | 46,243 | 212,491 |
| 1894..... | 40,527 | 121,581 | 1908..... | 47,336 | 224,824 |
| 1895..... | 34,198 | 102,594 | 1909..... | 64,644 | 222,812 |
| 1896..... | 33,715 | 101,155 | 1910..... | 53,870 | 187,064 |
| 1897..... | 38,910 | 116,730 | 1911..... | 82,666 | 365,820 |
| 1898..... | 32,218 | 128,872 | 1912..... | 81,526 | 314,081 |
| 1899..... | 27,687 | 110,748 | 1913..... | 158,566 | 521,181 |
| | | | 1914..... | 228,314 | 744,508 |

Imports:—Brimstone* and Crude Sulphur.

| Fiscal Year. | Pounds. | Value. | Fiscal Year. | Pounds. | Value. |
|--------------|-----------|--------|--------------------|------------|---------|
| | | \$ | | | \$ |
| 1880..... | 1,775,489 | 27,401 | 1898..... | 38,026,798 | 373,786 |
| 1881..... | 2,118,720 | 36,956 | 1899..... | 24,517,026 | 265,799 |
| 1882..... | 2,375,821 | 40,329 | 1900..... | 21,128,656 | 215,433 |
| 1883..... | 2,336,085 | 36,737 | 1901..... | 23,856,651 | 270,608 |
| 1884..... | 2,195,735 | 37,463 | 1902..... | 24,640,735 | 325,307 |
| 1885..... | 2,248,986 | 35,043 | 1903..... | 24,412,737 | 259,123 |
| 1886..... | 2,922,043 | 43,651 | 1904..... | 19,364,730 | 204,663 |
| 1887..... | 3,103,644 | 38,750 | 1905..... | 23,435,140 | 242,251 |
| 1888..... | 2,048,812 | 25,318 | 1906..... | 43,047,672 | 436,156 |
| 1889..... | 2,427,510 | 34,006 | 1907 (9 mos.)..... | 25,854,615 | 277,439 |
| 1890..... | 4,440,799 | 44,276 | 1908..... | 51,806,739 | 517,249 |
| 1891..... | 3,601,748 | 46,351 | 1909..... | 44,049,172 | 426,569 |
| 1892..... | 4,769,759 | 67,095 | Calendar Year. | | |
| 1893..... | 6,381,203 | 77,216 | 1910..... | 45,669,739 | 474,619 |
| 1894..... | 5,845,463 | 61,558 | 1911..... | 43,862,954 | 446,491 |
| 1895..... | 4,900,225 | 56,965 | 1912..... | 77,294,039 | 806,690 |
| 1896..... | 6,934,190 | 63,973 | 1913..... | 60,865,975 | 633,114 |
| 1897..... | 8,672,751 | 87,719 | 1914..... | 83,907,805 | 870,868 |

* Brimstone, crude or in roll or flour, or sulphur in roll or flour.

Exports of Pyrites.

| Calendar Year. | Tons. | Value. | Calendar Year. | Tons. | Value. |
|----------------|--------|--------|----------------|--------|---------|
| | | \$ | | | \$ |
| 1894..... | 8,532 | 33,205 | 1904..... | 18,279 | 49,911 |
| 1895..... | 7,705 | 38,298 | 1905..... | 19,755 | 55,767 |
| 1896..... | 15,002 | 33,837 | 1906..... | 26,050 | 65,349 |
| 1897..... | 15,096 | 30,812 | 1907..... | 25,056 | 80,139 |
| 1898..... | 9,804 | 26,387 | 1908..... | 17,283 | 96,600 |
| 1899..... | 15,599 | 34,084 | 1909..... | 35,798 | 156,644 |
| 1900..... | 17,620 | 41,182 | 1910..... | 30,434 | 110,071 |
| 1901..... | 24,971 | 57,263 | 1911..... | 32,102 | 120,585 |
| 1902..... | 18,584 | 50,178 | 1912..... | 5,938 | 11,935 |
| 1903..... | 21,067 | 59,604 | 1913..... | 46,066 | 211,640 |
| | | | 1914..... | 89,999 | 377,985 |

Imports of Sulphuric Acid.

| Fiscal Year. | Pounds. | Value. | Fiscal Year. | Pounds. | Value. |
|--------------|-----------|--------|----------------|-----------|--------|
| | | \$ | | | \$ |
| 1885..... | 774,764 | 10,791 | 1901..... | 448,608 | 5,272 |
| 1886..... | 507,927 | 7,930 | 1902..... | 420,731 | 4,626 |
| 1887..... | 678,603 | 8,468 | 1903..... | 102,314 | 2,332 |
| 1888..... | 2,494,648 | 35,415 | 1904..... | 113,407 | 2,563 |
| 1889..... | 181,652 | 2,606 | 1905..... | 920,804 | 8,227 |
| 1890..... | 211,871 | 2,927 | 1906..... | 822,585 | 8,558 |
| 1891..... | 177,627 | 2,466 | 1907..... | 733,151 | 6,901 |
| 1892..... | 222,628 | 2,837 | 1908..... | 650,095 | 7,582 |
| 1893..... | 172,422 | 2,367 | 1909..... | 241,388 | 3,298 |
| 1894..... | 107,520 | 1,648 | Calendar Year. | | |
| 1895..... | 174,605 | 2,481 | 1910..... | 2,474,802 | 21,702 |
| 1896..... | 114,137 | 1,430 | 1911..... | 1,031,803 | 9,281 |
| 1897..... | 977,446 | 8,033 | 1912..... | 4,971,446 | 35,325 |
| 1898..... | 665,344 | 5,536 | 1913..... | 145,074 | 4,054 |
| 1899..... | 165,637 | 2,427 | 1914..... | 332,274 | 7,149 |
| 1900..... | 740,858 | 7,066 | | | |

The following is a list of companies operating pyrites mines, in Canada:—

The Eustis Mining Company, Eustis, Que.

The Weedon Mining Company, Limited, Weedon, Que.

The Nichols Chemical Company of Canada, Limited, Sulphide, Ont., and 25 Broad St., New York.

The Canadian Sulphur Ore Co., Ltd., Queensboro, Ont.

The Northern Pyrites Company, Northpines, Ont., and 25 Broad St., New York.

Algoma Steel Corporation, Limited, Sault Ste. Marie, Ont.

The Madoc Mining Co., Goudreau, Ont., and 25 Broad St., New York.

QUARTZ.

Considerable quantities of quartz are used by the smelters of nickel copper ores. It is also used in the manufacture of ferro-silicon, and ground quartz is used for the manufacture of sanitary and enamelled ware.

The total shipments in 1914 are reported as 54,148 tons, valued at \$84,583, as compared with shipments of 78,261 tons, valued at \$169,842, in 1913, and 100,242 tons, valued at \$195,216, in 1912.

Imports of silex, or crystallized quartz in 1914 were 870 tons, valued at \$15,502, and the imports of flint during the same year were 3,835 tons, valued at \$47,931.

In 1913 the imports of silex were 690 tons, valued at \$13,811, and the imports of flint were 6,708 tons, valued at \$60,718.

Statistics of the annual production of quartz, so far as these have been obtained, are shown in the next table:—

Annual Production of Quartz.

| Calendar Year. | Tons. | Value. | Calendar Year. | Tons. | Value. |
|----------------|-------|--------|----------------|---------|---------|
| | | \$ | | | \$ |
| 1890..... | 200 | 1,000 | 1906..... | 48,376 | 65,765 |
| 1891-2..... | | | 1907..... | 56,585 | 124,148 |
| 1893..... | 100 | 500 | 1908..... | 44,741 | 52,830 |
| 1894-5-6..... | 10 | 50 | 1909..... | 56,924 | 71,285 |
| 1897..... | | | 1910..... | 88,205 | 91,951 |
| 1898..... | 284 | 570 | 1911..... | 60,526 | 83,865 |
| 1899..... | 600 | 1,260 | 1912..... | 100,242 | 195,216 |
| 1900-1905..... | | | 1913..... | 78,261 | 169,842 |
| | | | 1914..... | 54,148 | 84,583 |

Imports of Silex:—Crystallized Quartz.

| Fiscal Year. | Cwt. | Value. | Fiscal Year. | Cwt. | Value. |
|--------------|--------|--------|---------------------|--------|--------|
| | | \$ | | | \$ |
| 1880..... | 5,252 | 2,290 | 1898..... | 3,104 | 2,773 |
| 1881..... | 3,251 | 1,659 | 1899..... | 3,951 | 2,595 |
| 1882..... | 3,283 | 1,678 | 1900..... | 4,021 | 2,876 |
| 1883..... | 3,543 | 2,058 | 1901..... | 3,562 | 2,106 |
| 1884..... | 3,259 | 1,709 | 1902..... | 4,388 | 3,858 |
| 1885..... | 3,527 | 1,443 | 1903..... | 3,514 | 2,762 |
| 1886..... | 2,520 | 1,313 | 1904..... | 5,547 | 4,409 |
| 1887..... | 14,533 | 5,073 | 1905..... | 8,931 | 4,475 |
| 1888..... | 4,808 | 2,385 | 1906..... | 7,465 | 8,347 |
| 1889..... | 5,130 | 1,211 | 1907 (9 mos.)..... | 11,964 | 12,969 |
| 1890..... | 1,768 | 2,617 | 1908..... | 24,938 | 19,166 |
| 1891..... | 3,674 | 1,929 | 1909..... | 6,206 | 6,909 |
| 1892..... | 1,429 | 1,244 | Calendar Year. | | |
| 1893..... | 2,447 | 1,301 | 1910..... | 12,577 | 11,996 |
| 1894..... | 2,451 | 1,521 | 1911..... | 7,877 | 7,518 |
| 1895..... | 2,882 | 1,881 | 1912..... | 12,571 | 10,680 |
| 1896..... | 3,289 | 2,174 | 1913..... | 13,797 | 13,811 |
| 1897..... | 2,564 | 3,415 | 1914 Duty free..... | 17,407 | 15,502 |

SALT.

The production of salt in Canada has for a number of years been obtained from salt fields in southwestern Ontario, although there was at one time a very small production in New Brunswick and Manitoba.

The total sales of salt in 1914 were 107,038 tons, valued at \$493,648, exclusive of packages, as compared with sales of 100,791 tons, valued at \$491,280 in 1913 showing a continued increase in production.

The average number of men employed during the year was reported as 253 and the amount of wages paid \$178,277. The value of the packages used during the year was \$278,879 and stock of salt in manufacturers' hands at the close of the year was reported as 4,519 tons.

Detailed statistics of the production during the past six years, showing the total sales of salt, the value of the sales, exclusive of packages, the value of the packages used, stock in manufacturers' hands at the end of each year, number of men employed, wages paid, and the total annual production since 1886 are given in the following tables.

Detailed Statistics of Production of Salt, 1909-1914.

| | 1909. | 1910. | 1911. | 1912. | 1913. | 1914. |
|---|---------|---------|---------|---------|---------|---------|
| Sales of salt.....Tons | 84,037 | 84,092 | 91,582 | 95,053 | 100,791 | 107,038 |
| Value of salt (exclusive of packages).....\$ | 415,219 | 409,624 | 443,004 | 459,582 | 491,280 | 493,648 |
| Value of packages.....\$ | 175,612 | 173,446 | 198,789 | 224,696 | 262,479 | 278,879 |
| Stock in manufacturers' hands at end of year.....Tons | 2,671 | 2,474 | 1,422 | 3,256 | 4,066 | 4,519 |
| Men employed.....No. | 185 | 208 | 225 | 231 | 251 | 253 |
| Wages paid.....\$ | 96,116 | 112,909 | 123,040 | 155,648 | 178,386 | 178,277 |

Annual Production of Salt.

| Calendar Year. | Tons. | Value. | Calendar Year. | Tons. | Value. |
|----------------|--------|---------|----------------|---------|---------|
| | | \$ | | | \$ |
| 1886..... | 62,359 | 227,195 | 1900..... | 62,055 | 279,458 |
| 1887..... | 60,173 | 166,394 | 1901..... | 59,428 | 262,328 |
| 1888..... | 59,070 | 185,460 | 1902..... | 64,456 | 292,581 |
| 1889..... | 32,832 | 129,547 | 1903..... | 62,452 | 297,517 |
| 1890..... | 43,754 | 198,857 | 1904..... | 69,477 | 321,778 |
| 1891..... | 45,021 | 161,179 | 1905..... | 67,340 | 320,858 |
| 1892..... | 45,486 | 162,041 | 1906..... | 76,720 | 329,130 |
| 1893..... | 62,324 | 195,926 | 1907..... | 72,697 | 342,315 |
| 1894..... | 57,199 | 170,687 | 1908..... | 79,975 | 378,798 |
| 1895..... | 52,376 | 160,455 | 1909..... | 84,037 | 415,219 |
| 1896..... | 43,960 | 169,693 | 1910..... | 84,092 | 409,624 |
| 1897..... | 51,348 | 225,730 | 1911..... | 91,582 | 443,004 |
| 1898..... | 57,142 | 248,639 | 1912..... | 95,053 | 459,582 |
| 1899..... | 59,339 | 254,390 | 1913..... | 100,791 | 491,280 |
| | | | 1914..... | 107,038 | 493,648 |

The salt deposits of Canada and the salt industry have been made the subject of a special Report¹ published by the Mines Branch. In respect to Ontario, which is at present the centre of the salt industry in Canada, this Report states:—

"The salt obtained in this province is recovered by the evaporation of brine which has leached out rock salt from beds which occur in the Salina formation in the southwestern part of the Province bordering on Lake Huron, the St. Clair river, lake St. Clair, and the Detroit river. It is impossible, with our present knowledge, to determine definite boundaries of the salt basin; but, as far as it now stands proved, the area underlain by salt, in Ontario, lies west of a line joining the towns of Inverhuron, Teeswater, Brussels, Seaforth, London, and St. Thomas, and north of a line through Thamesville, Dresden, Lake St. Clair, Elmstead, and Amherstburg. The area enclosed within this boundary in Canada is about 3,000 square miles.

"The salt beds are known to vary in thickness. In some wells they occur in thin beds interstratified with dolomite and shale; the total combined thickness of all these beds varying from 100 to 200 feet. In other localities, as in the case of the beds at Windsor, the salt beds are of great thickness, one bed alone having a thickness of 200 feet. The average depth at which the salt is found is in excess of over 1,000 feet, there being a gradual increase in depth of the beds as one goes farther south.

"The production from a few wells has hitherto been sufficient to supply the domestic demand, and little exploration has been carried on by which the area underlain by salt can be definitely outlined. There has, however, been a great deal of exploratory work in connexion with the development of petroleum and natural gas fields. Where these boreholes extend below the salt horizon, they give evidence of either the presence, or the absence of salt.

"From the records available, it would appear that within the area mentioned, and outlined on the accompanying map, the salt beds are practically continuous; there are, however, some limited areas within these boundaries where—according to the records of drill holes that have penetrated below the Salina—there are no salt beds.

"The southeast boundary of the salt area is at present unknown as no drill records are obtainable from the district along the north shore of Lake Erie between St. Thomas and Chatham. Records from a hole at Orford, Kent county, show 171 feet of salt, at 1,510 feet below the collar of the hole; while another from Glencoe shows 104 feet of salt, at 1,290 feet below the surface. These records lead one to believe that possibly the beds are dipping to the southeast and may be found by deeper drilling in the vicinity of Lake Erie.

"The southwestern boundary merely marks the dividing line between the area beneath which salt beds are encountered, and the area where brines

¹ "The Salt Deposits of Canada and the Salt Industry," by L. Heber Cole, B.Sc., Mines Branch, Department of Mines, 1915, No. 325.

of a more or less density were found, although no rock salt was obtained.

"The salt beds are supposed to extend under the Detroit river, Lake St. Clair, St. Clair river, and the southern part of Lake Huron, since rock salt has been found in the Salina formation in the State of Michigan, on the opposite side of the International Boundary."

As at present carried on in western Ontario, the salt industry consists essentially in the production of table, dairy and coarse salt, and a small quantity of land salt. The brine is obtained by forcing water down boreholes sunk to the rock salt bed, through a casing inside of which is a pipe of smaller diameter. A powerful pump forces water down the outer tube; this dissolves the salt, eventually forming large cavities at the bottom of the well, which offer a great surface of salt to the action of the water. The water forced downwards is charged to saturation in the salt cavity, and, as the rock is not fissured or porous, this brine is forced upwards through the inner tube. After a process of purification and settling, this brine is evaporated either in vacuum pans or in large open air vats, and after passing through mechanical dryers or over drying floors, the salt is ready for the market.

In 1911 the Canadian Salt Company, at their Sandwich plant, commenced the manufacture of caustic soda by the electrolytic method, the liberated chlorine being utilized for the manufacture of bleaching powder. The following description of this plant is taken from Mr. Cole's Report.¹

"The brine is pumped directly into settling tanks, and from there it is carried to six concrete tanks, in which it is treated by soda ash in order to eliminate the lime which is present in small quantities. The soda ash is dissolved in hot water before adding to the brine. The purified brine is then treated in electrolytic cells, where the sodium chloride is decomposed into chlorine gas and metallic sodium. The metallic sodium at once reacts with the water, forming caustic soda. There are 256 of these cells, arranged in 8 rows, with 32 in each row. These cells employ direct current at 220 volts.

"The weak solution of caustic soda thus produced in these cells is concentrated in two vacuum pan evaporators, operated double effect. The solution is taken from these to storage tanks—after being through separators—to eliminate the salt. The final concentration is carried on in the finishing pots, and the pure caustic soda is run from the final pot into iron drums (700 lbs. capacity), and allowed to solidify. The finishing pots have a capacity of 18 tons each. They are made of cast iron, 10 feet in diameter, and 6 feet deep. The setting is built of fire brick.

"The chlorine gas, previously referred to as being generated in the cells, is piped to the bleaching chamber building, where it is allowed to circulate through eight bleaching chambers.

¹ "The Salt Deposits of Canada and the Salt Industry," by L. Heber Cole, B.Sc., Mines Branch, Dept. of Mines, 1915, No. 325, p. 43.

"These chambers are 20 ft. wide and 100 ft. long, and are lined on sides and roof with chemical lead. On the bottom are laid 2" cooling pipes, firmly secured by a covering of cement, over which is laid a layer of asphalt. This arrangement thoroughly protects the pipes from the gas. On top of the asphalt is laid a layer of hydrated lime 3" thick. The chlorine gas circulating through the chambers reacts with this lime, forming bleaching powder, which, when ready, is drawn off through openings in the bottom of each chamber. The shipping floor is situated beneath the chambers. The bleaching powder is packed in drums of 700 pounds capacity.

"The cooling pipes are connected with an ammonia refrigerating plant.

"The percentage of bleach in the chloride of lime produced at this plant will vary from 37 per cent to 39 per cent, i.e.: this bleach contains from 37 per cent to 39 per cent chlorine that is available for bleaching purposes.

"The whole product from this plant finds a ready market in Canada."

The annual imports of caustic soda and chloride of lime since 1910 are shown in the accompanying table.

Imports of Caustic Soda and Chloride of Lime.

| | Caustic Soda. | | Chloride of Lime. | |
|-----------|---------------|-----------|-------------------|-----------|
| | Pounds. | Value. | Pounds. | Value. |
| 1910..... | 13,974,444 | \$267,338 | 10,386,519 | \$116,923 |
| 1911..... | 13,812,053 | 259,982 | 11,725,167 | 118,501 |
| 1912..... | 14,544,545 | 278,579 | 12,183,765 | 113,346 |
| 1913..... | 15,983,298 | 291,008 | 12,761,153 | 115,614 |
| 1914..... | 18,436,827 | 314,278 | 15,147,645 | 138,619 |

EXPORTS AND IMPORTS.

Comparatively small quantities of salt are now exported from Canada, the exports in 1914 being 952,700 pounds, valued at \$5,229, as compared with exports of 460,900 pounds, valued at \$3,047 in 1913.

The imports of salt on the other hand are quite considerable, and in total value greatly exceed the domestic production.

For the calendar year 1914 the imports of salt subject to duty included: salt in bulk 26,065 tons, valued at \$82,149, and salt in bags, barrels, or other packages 7,828 tons, valued at \$68,959. Salt imported from the United Kingdom or any British possession, or imported for the use of sea or gulf fisheries, duty free, was imported to the extent of 108,753 tons, valued at \$389,773, giving total imports of 142,646 tons, valued at \$540,881.

The total consumption of salt, domestic and imported, was in 1914 approximately 249,208 tons, valued at \$1,029,300, as compared with a consumption in 1913 of 245,007 tons, valued at \$1,053,516.

The statistics of exports and imports of salt since 1880, are shown in tables following:—

Exports of Salt.

| Calendar Year. | Bushels. | Value. | Calendar Year. | Bushels. | Value. |
|----------------|----------|--------|----------------|-----------|--------|
| | | \$ | | | \$ |
| 1880..... | 467,641 | 46,211 | 1898..... | 5,202 | 1,252 |
| 1881..... | 343,208 | 44,627 | 1899..... | 11,205 | 2,773 |
| 1882..... | 181,758 | 18,350 | 1900..... | 37,653 | 8,997 |
| 1883..... | 199,733 | 19,492 | 1901..... | 39,224 | 6,510 |
| 1884..... | 167,029 | 15,291 | 1902..... | 9,331 | 3,798 |
| 1885..... | 246,794 | 18,756 | | | |
| 1886..... | 224,943 | 16,886 | | Lbs. | |
| 1887..... | 154,045 | 11,526 | 1903..... | 1,915,648 | 5,927 |
| 1888..... | 15,251 | 3,987 | 1904..... | 1,006,036 | 4,186 |
| 1889..... | 8,557 | 2,390 | 1905..... | 1,447,728 | 6,112 |
| 1890..... | 6,605 | 1,166 | 1906..... | 618,707 | 3,437 |
| 1891..... | 5,290 | 1,277 | 1907..... | 2,222,542 | 7,709 |
| 1892..... | 2,000 | 504 | 1908..... | 529,229 | 3,840 |
| 1893..... | 4,940 | 1,267 | 1909..... | 276,765 | 2,488 |
| 1894..... | 4,639 | 1,120 | 1910..... | 275,200 | 2,618 |
| 1895..... | 4,865 | 959 | 1911..... | 454,600 | 5,055 |
| 1896..... | 3,842 | 899 | 1912..... | 289,150 | 3,723 |
| 1897..... | 5,383 | 1,193 | 1913..... | 460,900 | 3,047 |
| | | | 1914..... | 952,700 | 5,229 |

Imports:—Salt Paying Duty.

| Fiscal Year. | Pounds. | Value. | Fiscal Year. | Pounds. | Value. |
|--------------|------------|--------|--------------------|------------|---------|
| | | \$ | | | \$ |
| 1880..... | 726,640 | 3,916 | 1898..... | 11,068,785 | 32,792 |
| 1881..... | 2,588,465 | 6,355 | 1899..... | 11,781,453 | 32,839 |
| 1882..... | 3,679,415 | 12,318 | 1900..... | 11,028,337 | 30,180 |
| 1883..... | 12,136,968 | 36,223 | 1901..... | 11,625,688 | 34,087 |
| 1884..... | 12,770,950 | 38,949 | 1902..... | 13,892,849 | 39,605 |
| 1885..... | 10,397,761 | 31,726 | 1903..... | 14,554,693 | 41,785 |
| 1886..... | 12,266,021 | 39,181 | 1904..... | 29,779,183 | 73,826 |
| 1887..... | 10,413,258 | 35,670 | 1905..... | 18,473,868 | 58,056 |
| 1888..... | 10,509,799 | 32,136 | 1906..... | 21,366,064 | 59,805 |
| 1889..... | 11,190,088 | 38,968 | 1907 (9 mos.)..... | 21,834,435 | 58,553 |
| 1890..... | 15,135,109 | 57,549 | 1908..... | 31,019,400 | 79,341 |
| 1891..... | 15,140,827 | 59,311 | 1909..... | 31,653,900 | 83,660 |
| 1892..... | 18,648,191 | 65,963 | Calendar Year. | | |
| 1893..... | 21,377,339 | 79,838 | 1910..... | 40,347,500 | 97,326 |
| 1894..... | 15,867,825 | 53,336 | 1911..... | 46,351,900 | 109,793 |
| 1895..... | 8,498,404 | 29,881 | 1912..... | 60,134,500 | 133,869 |
| 1896..... | 7,665,257 | 24,550 | 1913..... | 63,015,000 | 147,775 |
| 1897..... | 11,911,766 | 33,470 | 1914..... | 67,786,600 | 151,108 |

| | 1913. | | 1914. | |
|--|------------|---------|------------|---------|
| | Pounds. | Value. | Pounds. | Value. |
| | | \$ | | \$ |
| Salt, fine, in bulk, n.e.s. (a)..... | 45,574,800 | 73,115 | 52,131,100 | 82,149 |
| Salt, n.e.s., in bags, barrels or other packages (b) ... | 17,440,200 | 74,660 | 15,655,500 | 68,959 |
| Total..... | 63,015,000 | 147,775 | 76,786,600 | 151,108 |

(a) Duty 5c per 100 lbs. (b) Duty 7½ c per 100 lbs.

| Fiscal Year. | Pounds. | Value. | Fiscal Year. | Pounds. | Value. |
|--------------|-------------|---------|--------------------|-------------|---------|
| | | \$ | | | \$ |
| 1880..... | 212,714,747 | 400,167 | 1898..... | 202,634,927 | 293,410 |
| 1881..... | 231,640,610 | 488,278 | 1899..... | 183,046,365 | 267,520 |
| 1882..... | 166,183,962 | 311,489 | 1900..... | 193,554,550 | 295,253 |
| 1883..... | 246,747,113 | 386,144 | 1901..... | 216,271,603 | 339,887 |
| 1884..... | 225,390,121 | 321,243 | 1902..... | 238,648,737 | 385,629 |
| 1885..... | 171,571,209 | 255,719 | 1903..... | 232,708,675 | 361,185 |
| 1886..... | 180,205,949 | 255,359 | 1904..... | 198,634,047 | 338,082 |
| 1887..... | 203,042,332 | 285,455 | 1905..... | 196,907,500 | 340,954 |
| 1888..... | 184,166,986 | 220,975 | 1906..... | 203,080,000 | 352,214 |
| 1889..... | 180,847,800 | 253,009 | 1907 (9 mos.)..... | 139,459,900 | 240,841 |
| 1890..... | 158,490,075 | 252,291 | 1908..... | 200,944,800 | 350,878 |
| 1891..... | 195,491,410 | 321,239 | 1909..... | 232,237,700 | 376,961 |
| 1892..... | 201,831,217 | 314,995 | Calendar Year. | | |
| 1893..... | 191,595,530 | 281,462 | 1910..... | 217,587,000 | 364,735 |
| 1894..... | 196,668,730 | 328,300 | 1911..... | 202,347,100 | 326,325 |
| 1895..... | 201,691,248 | 332,711 | 1912..... | 219,278,900 | 352,081 |
| 1896..... | 205,005,100 | 338,888 | 1913..... | 225,877,200 | 417,508 |
| 1897..... | 215,844,484 | 312,117 | 1914..... | 217,505,500 | 389,773 |

* Salt imported from the United Kingdom, or any British possession, or imported for the use of the sea or gulf fisheries.

Consumption of Salt in Canada in 1913 and 1914.

| | 1913. | | 1914. | |
|-----------------------------------|-------------|------------|-------------|------------|
| | Pounds. | Value. | Pounds. | Value. |
| Canadian salt production..... | 201,582,000 | \$ 491,280 | 214,076,000 | \$ 493,648 |
| Less exports..... | 460,900 | 3,047 | 952,700 | 5,229 |
| | 201,121,100 | 488,233 | 213,123,300 | 488,419 |
| Imports of salt paying duty..... | 63,015,000 | 147,775 | 67,786,600 | 151,108 |
| Imports of salt free of duty..... | 225,877,200 | 417,508 | 217,505,500 | 389,773 |
| | 490,013,300 | 1,053,516 | 498,415,400 | 1,029,300 |

The following is a list of operators:—

| Operator. | Address. | Location. | No. of Wells. | Depth. |
|---------------------------------------|-------------------------------|-----------------|---------------|----------------|
| | | | | Ft. |
| †New Brunswick Salt Works | Plumweseep, N.B. | Plumweseep | | |
| The Canadian Salt Co., Ltd. | Windsor, Ont. | Windsor | 6 | 1,200 to 1,700 |
| | | Sandwich | 2 | 1,200 & 1,700 |
| The Western Salt Co., Ltd. | Courtwright | Courtwright | 1 | 1,800 |
| | | Mooretown | 1 | 1,700 |
| Stapleton Salt Works | Clinton, Ont, Box 29 | Stapleton | 1 | 1,300 |
| North American Chem. Co. | " | Goderich | 1 | 1,200 |
| *Jas. H. Kittermaster | Sarnia, Ont., 175 Christie S. | Mooretown | 1 | |
| The Dominion Salt Co., Ltd. | Sarnia, Ont. | Sarnia | 3 | 1,700 & 2,100 |
| *The Sarnia Salt Works Co., Ltd. | Windsor, Ont., 36 Elliott | | | |
| The Elarton Salt Works Co., Ltd. | Hyde Park Corner | Warwick | 1 | 1,397 |
| Parkhill Salt Co. | Parkhill, Ont. | Parkhill | 1 | |
| Exeter Salt Works Co., Ltd. | Exeter, Ont. | Exeter | 1 | 1,225 |
| *Hensall Salt Works | Hensall, Ont. | | | |
| Western Can. Flour Mills Co., Ltd. | Goderich, Ont. | Goderich | 1 | 1,100 |
| *Goderich Salt Works (P. McEwan Est.) | " | " | 1 | 1,050 |
| Ontario Peoples Salt & Soda Co., Ltd. | Kincardine, Ont. | Kincardine | 1 | 981 |
| Gray, Young & Sparling Co., Ltd. | Wingham, Ont. | Wingham | 1 | 1,116 |
| *Prairie Lime & Salt Co., Ltd. | Edmonton, 949 Fraser Ave | Maefeking, Man. | | |
| B. C. Salt Works, Ltd. | Prince Rupert, B.C. | Kwinitsa | 1 | 300 |

*Not in operation.

†Development work in progress.

TALC.

Talc is being mined in the Province of Ontario only, two mines being operated during 1914 in the county of Hastings, at Madoc and Eldorado, respectively.

The total quantity of shipments by the operators of the mines in 1914 were 10,808 tons, valued at \$40,418, as compared with 12,250 tons, valued at \$45,980, in 1913.

The operators are:—

Messrs. Cross & Wellington, Madoc, operating the Henderson mine on lot 14, concession XIV, Huntingdon township.

Eldorite Limited, Eldorado, operating a mine and small mill near Eldorado, lot 20, concession V, Madoc township.

The Henderson mine has been operated for some years, the greater part of the output being sold to Geo. H. Gillespie & Co., who operate a grinding mill at Madoc, the balance being exported to the United States.

In 1914, 1,269 tons were shipped crude to the United States, the balance being sent to Canadian grinding mills. In 1913, 2,750 tons were shipped crude to the United States. The crude talc is valued at about \$2 per ton at the mine, and the ground or refined talc at an average of about \$8 per ton.

The imports of talc during the calendar year 1914, according to Customs Department returns, were 584 tons, valued at \$8,983 or an average value per ton of \$15.38, as against imports of 402 tons, valued at \$10,706, or an average value per ton of \$26.63 in 1913.

Annual Production of Soapstone and Talc.

| Calendar Year. | Tons. | Value. | Calendar Year. | Tons. | Value. |
|----------------|-------|--------|----------------|--------|--------|
| | | \$ | | | \$ |
| 1886..... | 50 | 400 | 1900..... | 1,420 | 6,365 |
| 1887..... | 100 | 800 | 1901..... | 259 | 842 |
| 1888..... | 140 | 280 | 1902..... | 689 | 1,804 |
| 1889..... | 195 | 1,170 | 1903..... | 990 | 2,739 |
| 1890..... | 917 | 1,239 | 1904..... | 840 | 1,875 |
| 1891..... | Nil. | Nil. | 1905..... | 500 | 1,800 |
| 1892..... | 1,374 | 6,240 | 1906..... | 1,234 | 3,030 |
| 1893..... | 717 | 1,920 | 1907..... | 1,534 | 4,602 |
| 1894..... | 916 | 1,640 | 1908..... | 1,016 | 3,048 |
| 1895..... | 475 | 2,138 | 1909..... | 4,350 | 10,300 |
| 1896..... | 410 | 1,230 | 1910..... | 7,112 | 22,308 |
| 1897..... | 157 | 350 | 1911..... | 7,300 | 22,100 |
| 1898..... | 405 | 1,000 | 1912..... | 8,270 | 23,132 |
| 1899..... | 450 | 1,960 | 1913..... | 12,250 | 45,980 |
| | | | 1914..... | 10,808 | 40,418 |

STRUCTURAL MATERIALS AND CLAY PRODUCTS.

INTRODUCTORY.

The subjects included under this heading comprise, in the order treated: cement; clay products of various kinds, such as brick, sewerpipe and tile, pottery, etc.; lime; sand-lime brick; sands and gravels; slate; and stone for building and other purposes, including granite, marble, limestone, sandstone, etc. Previous to 1912 no attempt had been made to collect a record of the production of sands and gravels in Canada, and the only statistics available were those of exports and imports. In 1912 however a beginning was made in the collection of these statistics; but owing to the incompleteness of the available lists of producers and the failure of many to answer correspondence, only a very partial record was obtained. In 1913 the scope of the collection was extended to cover sands and gravels used by railways for ballasting, etc. The statistics of stone production do not include the stone used in making cement or lime, but are as complete as possible for all other established stone quarries; nevertheless there is undoubtedly a large production of stone for foundation work, road-making, and railway construction of which no record is available.

The total value of the production of these structural products in 1914, according to the record obtained, was \$26,009,227 as compared with a value of \$30,809,752 in 1913, a decrease of \$4,800,525 or over 15·5 per cent.

For several years previous to 1913 the aggregate imports of structural material had been increasing at a more rapid rate than the domestic production. In 1913 and 1914, however, the exports continued to increase, while the imports fell off very materially, the decrease being 10 per cent in 1913 and 33 per cent in 1914.

The apparent total consumption of products of this class based upon the statistics of production in conjunction with the records of exports and imports was in 1914 valued at \$31,596,404 as compared with \$39,916,642 in 1913, and \$39,128,509 in 1912.

The approximate consumption in 1911 was slightly less than \$30,000,000 and about \$25,250,000 in 1910, and \$20,350,000 in 1909. The decrease in consumption in 1914 was nearly 21 per cent as against increases of nearly 2 per cent in 1913, 30 per cent in 1912, 18 per cent in 1911, and 24 per cent in 1910.

A summary of the production, imports, exports, and consumption of structural materials and clay products in 1914, and in 1913, and the annual production from 1908 to 1912, are shown in tables herewith.

Structural Materials, Calendar Year, 1914.

| — | Production. | Imports. | Exports. | Con- sumption. |
|-----------------------|-------------|-----------|----------|-------------------|
| | \$ | \$ | \$ | \$ |
| Cement, Portland..... | 9,187,924 | 159,691 | 2,223 | 9,345,392 |
| Clay products..... | 6,871,957 | 4,467,140 | 48,073 | 11,291,024 |
| Lime..... | 1,360,628 | 211,123 | 16,927 | 1,554,824 |
| Sand-lime brick..... | 609,515 | | | 609,515 |
| Sand and gravels..... | 2,505,310 | 224,759 | 802,358 | 1,927,711 |
| Slate..... | 4,837 | 213,256 | | 218,093 |
| Stone..... | 5,469,056 | 1,252,869 | 72,080 | 6,649,845 |
| | 26,009,227 | 6,528,838 | 941,661 | 31,596,404 |

Structural Materials, Calendar Year, 1913.

| — | Production. | Imports. | Exports. | Con- sumption. |
|-----------------------|-------------|-----------|----------|-------------------|
| | \$ | \$ | \$ | \$ |
| Cement, Portland..... | 11,019,418 | 409,303 | 1,739 | 11,426,982 |
| Clay products..... | 9,504,314 | 6,760,752 | 52,333 | 16,212,733 |
| Lime..... | 1,609,398 | 238,271 | 29,234 | 1,818,435 |
| Sand-lime brick..... | 906,665 | | | 906,665 |
| Sand and gravels..... | 2,258,874 | 440,343 | 440,956 | 2,258,261 |
| Slate..... | 6,444 | 235,474 | | 241,918 |
| Stone..... | 5,504,639 | 1,640,849 | 93,840 | 7,051,648 |
| | 30,809,752 | 9,724,992 | 618,102 | 39,916,642 |

Production of Structural Materials, 1908-1912.

| — | 1908. | 1909. | 1910. | 1911. | 1912. |
|---------------------------------|------------|------------|------------|------------|------------|
| | \$ | \$ | \$ | \$ | \$ |
| Cement..... | 3,709,954 | 5,345,802 | 6,412,215 | 7,644,537 | 9,106,556 |
| Clay products..... | 4,500,702 | 6,450,840 | 7,629,956 | 8,359,933 | 10,575,869 |
| Lime..... | 712,947 | 1,132,756 | 1,137,079 | 1,517,599 | 1,844,849 |
| Sand-lime brick..... | 152,856 | 201,650 | 371,857 | 442,427 | 1,020,386 |
| Sand and gravels (exports)..... | 161,387 | 256,166 | 407,974 | 408,110 | 1,512,099 |
| Slate..... | 13,496 | 19,000 | 18,492 | 8,248 | 8,939 |
| Stone..... | 2,088,613 | 3,127,135 | 3,650,019 | 4,328,757 | 4,726,171 |
| Total..... | 11,339,955 | 16,533,349 | 19,627,592 | 22,709,611 | 28,794,869 |

It will be noted that there was a falling off in the production of all products except sand and gravel, the increase in which, as in 1913, is probably chiefly due to the greater completeness of the record covering the past year. The financial stringency, the effects of which had already begun to be experienced in 1913, together with the conditions arising out of the war, caused a great falling off in building activities of all kinds, resulting in the decreased production shown.

According to apparently reliable records, the total value of the building permits in twenty-five eastern cities in Canada increased from a little over \$26,000,000 in 1908 to over \$78,000,000 in 1912, and nearly \$90,000,000 in 1913. The aggregate value of building permits in 15 western cities increased from about \$18,000,000 in 1908 to nearly \$117,000,000 in 1912, but fell off in 1913 to \$72,000,000. Thus, while structural activity increased more rapidly in western Canada, this section was the first to feel the effects of the set back. This would appear to be confirmed by the statistics of production of clay products in 1913, which showed an increase in eastern provinces but a very great decrease in all provinces west of the Great Lakes.

The total value of building permits in 40 cities in Canada during 1913, according to the above record, was thus about \$160,000,000.

Statistics of the value of building permits issued in 1913 and 1914, as published in the Labour Gazette of April 1913, show the total value of permits in 86 localities in 1913 as about \$171,000,000, and as about \$107,000,000 in 1914, or a falling off of over 37 per cent during the past year. The same record shows building permits in 50 eastern cities in 1914 valued at \$70,000,000, as against \$97,000,000 in 1913, and permits in 36 western localities in 1914 valued at \$36,000,000, as against \$74,000,000 in 1913, a falling off of nearly 30 per cent in eastern Canada, as against over 50 per cent in western Canada.

CEMENT.

The total quantity of cement made in 1914, according to returns received from the manufacturers, was 8,727,269 barrels of 350 pounds net each (1,527,272 tons), as compared with 8,886,333 barrels made in 1913, a decrease of 159,064 barrels (27,836 tons), or nearly 2 per cent.

The total quantity of Canadian Portland cement sold in 1914 was 7,172,480 barrels (1,255,184 tons), as compared with 8,658,805 barrels (1,515,291 tons) in 1913, a decrease of 1,486,325 barrels (260,107 tons), or 17.2 per cent.

The total consumption of cement in 1914 including Canadian and imported cement was 7,270,502 barrels of 350 pounds net each (1,272,338 tons), as compared with 8,912,898 barrels (1,559,757 tons) in 1913, a decrease of 1,642,396 barrels (287,419 tons), or over 18 per cent.

The production of cement in Canada during the past few years, though all classed as Portland, has included an output of Puzzolan cement, made from blast furnace slag at Sydney, N.S., and a small production of "natural Portland," made at Babcock, Manitoba, 75 miles southwest of Winnipeg, on the Canadian Northern railway.

The production of cement in 1914 was derived from 24 operating plants, but of these three were in commission for a few days only, and of the others, seven were in operation less than five months. Five plants were idle throughout the year. The total daily capacity of 29 completed plants was 51,415 barrels, while of these the five plants idle throughout the year had a total daily capacity of 3,600 barrels.

The completed plants were distributed as follows: one in Nova Scotia, using blast furnace slag; three in Quebec, using limestone and clay; sixteen in Ontario, of which ten used marl and six limestone; two rock plants in Manitoba, one of which makes a "natural Portland"; four in Alberta including one marl plant and three limestone plants; and three rock plants in British Columbia.

The average number of men employed in Canadian cement plants during 1914 was 2,977 and the total wages paid \$2,271,006. In 1913 the average number of men employed was 4,276 and wages paid \$3,466,451.

Statistics of the total annual sales of natural rock and Portland cement since 1887 are shown in the following table:—

Annual Production* of Cement.

| Calendar Year. | Natural rock cement. | | | Portland cement. | | | Totals. | |
|----------------|----------------------|---------|----------------|------------------|------------|----------------|-----------|------------|
| | Barrels. | Value. | Average value. | Barrels. | Value. | Average value. | Barrels. | Value. |
| | | \$ | \$ cts. | | \$ | \$ cts. | | \$ |
| 1887..... | | | | | | | 69,843 | 81,909 |
| 1888..... | | | | | | | 50,668 | 35,593 |
| 1889..... | 90,474 | 69,790 | 0 77 | Nil. | Nil. | | 90,474 | 69,790 |
| 1890..... | 87,521 | 74,822 | 0 85 | 14,695 | 17,583 | 1 20 | 102,216 | 92,405 |
| 1891..... | 90,846 | 103,479 | 1 14 | 2,633 | 5,082 | 1 93 | 93,479 | 108,561 |
| 1892..... | 88,187 | 94,912 | 1 08 | 29,221 | 52,751 | 1 81 | 117,408 | 147,663 |
| 1893..... | 126,673 | 130,167 | 1 03 | 31,924 | 63,848 | 2 00 | 158,597 | 194,015 |
| 1894..... | 72,965 | 74,842 | 1 03 | 35,177 | 69,795 | 1 98 | 108,142 | 144,637 |
| 1895..... | 66,219 | 60,795 | 0 92 | 62,075 | 112,880 | 1 82 | 128,294 | 173,675 |
| 1896..... | 70,705 | 60,500 | 0 86 | 78,385 | 141,151 | 1 80 | 149,090 | 201,651 |
| 1897..... | 85,450 | 65,893 | 0 77 | 119,763 | 209,380 | 1 75 | 205,213 | 275,273 |
| 1898..... | 87,125 | 73,412 | 0 84 | 163,084 | 324,168 | 1 99 | 250,209 | 397,580 |
| 1899..... | 147,387 | 119,308 | 0 81 | 255,366 | 513,983 | 2 01 | 396,753 | 633,291 |
| 1900..... | 125,428 | 99,994 | 0 80 | 292,124 | 562,916 | 1 93 | 417,552 | 662,910 |
| 1901..... | 133,328 | 94,415 | 0 71 | 317,066 | 565,615 | 1 78 | 450,394 | 660,030 |
| 1902..... | 127,931 | 98,932 | 0 77 | 594,594 | 1,028,618 | 1 73 | 722,525 | 1,127,550 |
| 1903..... | 92,252 | 74,655 | 0 81 | 627,741 | 1,150,592 | 1 83 | 719,993 | 1,225,247 |
| 1904..... | 56,814 | 50,247 | 0 88 | 910,358 | 1,287,992 | 1 41 | 967,172 | 1,338,239 |
| 1905..... | 14,184 | 10,274 | 0 72 | 1,346,548 | 1,913,740 | 1 42 | 1,360,732 | 1,924,014 |
| 1906..... | 8,610 | 6,052 | 0 70 | 2,119,764 | 3,164,807 | 1 49 | 2,128,374 | 3,170,859 |
| 1907..... | 5,775 | 4,043 | 0 70 | 2,436,903 | 3,777,328 | 1 55 | 2,441,868 | 3,781,371 |
| 1908..... | 1,044 | 815 | 0 78 | 2,665,289 | 3,709,139 | 1 39 | 2,666,333 | 3,709,954 |
| 1909..... | 0 | 0 | ..... | 4,067,709 | 5,345,802 | 1 31 | 4,067,709 | 5,345,802 |
| 1910..... | 0 | 0 | ..... | 4,753,975 | 6,412,215 | 1 35 | 4,753,975 | 6,412,215 |
| 1911..... | 0 | 0 | ..... | 5,692,915 | 7,644,537 | 1 34 | 5,692,915 | 7,644,537 |
| 1912..... | 0 | 0 | ..... | 7,132,732 | 9,106,556 | 1 28 | 7,132,732 | 9,106,556 |
| 1913..... | 0 | 0 | ..... | 8,658,805 | 11,019,418 | 1 27 | 8,658,805 | 11,019,418 |
| 1914..... | 0 | 0 | ..... | 7,172,480 | 9,187,924 | 1 28 | 7,172,480 | 9,187,924 |

* Quantities sold or used.

A comparison of the principal statistics of 1913 and 1914 showing the increase or decrease, as the case may be, is given in the next table:—

It will be noted that the output exceeded the sales by about 1,554,000 barrels and consequently stocks were increased during the year by about this amount. The average price per barrel at the mill for all plants was \$1.28 in 1914 as compared with \$1.27 in 1913, $1.27\frac{3}{4}$ in 1912, and \$1.34 in 1911. The average price at the mill in the several provinces was: Quebec \$1.17 in 1914 and \$1.16 in 1913; Ontario \$1.10 in 1914 and \$1.08 in 1913; Manitoba \$1.83 in 1914; Alberta \$1.89 in 1914 and \$2.04 in 1913, and British Columbia \$1.67 in 1914, as against \$1.71 in 1913.

The imports of cement in 1914 again show a falling off amounting to nearly 62 per cent from those of 1913, while the average price of imported cement decreased from \$1.61 in 1913 to \$1.50 in 1914.

Comparison of Production, Sales, and Imports of Portland Cement in 1913 and 1914.

| | 1913. | 1914. | Increase. | Per cent. | Decrease. | Per cent. |
|--|------------|-----------|-----------|-----------|-----------|-----------|
| Cement sold or used..... Bls. | 8,658,805 | 7,172,480 | | | 1,486,325 | 17.2 |
| Cement manufactured..... " | 8,886,333 | 8,727,269 | | | 159,064 | 1.8 |
| Stock on hand Jan. 1..... " | 862,067 | 1,073,328 | 211,261 | 24.5 | | |
| Stock on hand Dec. 31..... " | 1,089,595 | 2,628,117 | 1,538,522 | 141.2 | | |
| Value of cement sold or used.... \$ | 11,019,418 | 9,187,924 | | | 1,831,494 | 16.6 |
| Average price per barrel..... " | 1.27 | 1.28 | 0.01 | 0.8 | | |
| Wages paid..... " | 3,466,451 | 2,271,006 | | | 1,195,445 | 34.5 |
| Men employed..... No. | 4,276 | 2,977 | | | 1,299 | 30.4 |
| Imports of Portland cement..... Bls. | 254,093 | 98,022 | | | 156,071 | 61.4 |
| Value of cement..... \$ | 409,303 | 147,158 | | | 262,145 | 64.0 |
| Average price per barrel..... " | 1.61 | 1.50 | | | 11 cents | 6.83 |
| Total consumption of cement in Canada..... Bls. | 8,912,898 | 7,270,502 | | | 1,642,396 | 18.4 |

Of the total cement made in 1914, 641,869 barrels were made from marl, and 8,085,400 barrels from limestone and slag. In 1913, 1,491,131 barrels were made from marl and 7,395,202 barrels from limestone and slag. In 1912, 1,420,155 barrels were made from marl, and 5,720,849 barrels from limestone and slag; while in 1911, 1,626,857 barrels were made from marl and 4,050,682 barrels were made from limestone and slag. With the exception of the new plant at Marlboro, Alberta, practically all of the newer plants erected during the past few years have been limestone plants. The proportion of cement made from marl in 1908 was about 45 per cent of the total output as compared with 28 per cent in 1911, 20 per cent in 1912, 16.8 per cent in 1913, and 7.3 per cent in 1914.

Statistics of the annual production of Portland cement since 1897, showing the quantity made, quantity sold, stocks on hand at the end of the year, value of sales, etc., are shown in the next table.

Annual Production of Portland Cement.

| Year. | Number of operating plants. | Quantity made. | Quantity sold. | On hand Dec. 31. | Value of sales. | Average per barrel. | Daily capacity. |
|-----------|-----------------------------------|-------------------|-------------------|---------------------|--------------------|------------------------|--------------------|
| | | Barrels. | Barrels. | Barrels. | \$ | \$ cts. | Barrels. |
| 1897..... | | | 119,763 | | 209,380 | 1 75 | |
| 1898..... | | | 163,084 | | 324,168 | 1 99 | |
| 1899..... | | | 225,366 | | 513,983 | 2 01 | |
| 1900..... | | | 292,124 | | 562,916 | 1 91 | |
| 1901..... | 4 | 360,160 | 317,066 | 58,094 | 565,615 | 1 78 | |
| 1902..... | 8 | 562,335 | 594,594 | 33,446 | 1,028,618 | 1 73 | 3,900 |
| 1903..... | 9 | 714,136 | 627,741 | 128,386 | 1,150,592 | 1 83 | 4,850 |
| 1904..... | 10 | 908,990 | 910,358 | 112,051 | 1,287,992 | 1 41 | |
| 1905..... | 13 | 1,541,568 | 1,346,548 | 306,466 | 1,913,740 | 1 42 | 8,000 |
| 1906..... | 15 | 2,152,562 | 2,119,764 | 302,356 | 3,164,807 | 1 49 | 10,500 |
| 1907..... | 17 | 2,491,513 | 2,436,093 | 354,435 | 3,777,328 | 1 55 | 14,400 |
| 1908..... | 23 | 3,495,961 | 2,665,289 | 1,214,021 | 3,709,139 | 1 39 | 27,500 |
| 1909..... | 22 | 4,146,708 | 4,067,709 | 1,777,238 | 5,345,802 | 1 31 | 23,050 |
| 1910..... | 22 | 4,396,282 | 4,753,975 | 832,038 | 6,412,215 | 1 35 | 25,835 |
| 1911..... | 24 | 5,677,539 | 5,692,915 | 903,589 | 7,644,537 | 1 34 | 28,810 |
| 1912..... | 24 | 7,141,004 | 7,132,732 | 903,094 | 9,106,556 | 1 28 | 36,515 |
| 1913..... | 27 | 8,886,333 | 8,658,805 | 1,089,595 | 11,019,418 | 1 27 | 50,540 |
| 1914..... | 24 | 8,727,269 | 7,172,480 | 2,628,117 | 9,187,924 | 1 28 | 51,415 |

Imports and Exports:—The quantity of cement exported is not recorded but the value in 1914 is reported as \$2,223 as against a value of exports in 1913 of \$1,739 and \$2,436 in 1912.

The imports of cement previous to 1901 were larger than the Canadian production, but gave way steadily to the increasing domestic output until 1909, during which year the imports amounted to 142,194 barrels, or about 3 per cent of the Canadian consumption. From 1910 to 1912 inclusive there was a steady increase in the importation of cement, the imports in 1912 being 1,434,413 barrels. During four and a half months of that year the duty was, on account of the scarcity in western Canada, reduced by one-half, and on May 31, 1913, a permanent reduction was made in the general tariff from 12½ cents to 10 cents per hundred pounds. The imports, however, have fallen to 254,093 barrels in 1913 and 98,022 barrels in 1914.

The United States has been the principal source of imports during the past few years and supplied about 71 per cent of the imports in 1914, as compared with 27 per cent from Great Britain. In 1913 about 68 per cent of the imports were from the United States, and 30 per cent from Great Britain. The imports of cement during 1913 and 1914 by countries, are shown in the next table.

Imports of Cement, 1913 and 1914.

| | 1913. | | | | 1914. | | | |
|------------------------------------|---------|-----------|---------|----------------|---------|-----------|---------|----------------|
| | Cwt. | Per cent. | Value. | Average value. | Cwt. | Per cent. | Value. | Average value. |
| | | | \$ | Cts. | | | \$ | Cts. |
| Great Britain..... | 270,747 | 30.4 | 94,844 | 35 | 93,709 | 27.3 | 35,517 | 38 |
| United States.... | 603,044 | 67.8 | 305,165 | 51 | 241,910 | 70.5 | 108,487 | 45 |
| Belgium..... | 3,483 | 0.4 | 3,307 | 95 | 7,457 | 2.2 | 3,154 | 43 |
| Other countries... | | | | | | | | |
| Hong Kong..... | 12,050 | 1.4 | 5,987 | 49 | | | | |
| Totals..... | 889,324 | 100.0 | 409,303 | 46 | 343,076 | 100.0 | 147,158 | 43 |
| Equivalent in barrels of 350 lbs.. | 254,093 | | | | 98,022 | | | |

A permanent revision of the cement duties was made in the early part of 1913, and from May 13, 1913, the cement duties have been as follows:—

| | British Preferential tariff. | Intermediate tariff. | General tariff. |
|--|------------------------------|----------------------|-----------------|
| Cement, Portland, and hydraulic or water lime, in barrels, bags, or casks, the weight of the package to be included in the weight for duty per hundred pounds..... | 7 cents..... | 10 cents..... | 10 cents..... |
| Bags in which cement or lime mentioned in the next preceding item is imported..... | 15 per cent.... | 20 per cent.... | 20 per cent.... |

This is equivalent to a duty under the general and intermediate tariffs of 35 cents per barrel on cement, and 8 cents on the bags, or a total of 43 cents per barrel.

Statistics of the exports of cement since 1891 and of imports since 1880 are given in the next two tables.

Exports of Cement.

| Calendar Year. | Value. | Calendar Year. | Value. | Calendar Year. | Value. |
|----------------|--------|----------------|--------|----------------|---------|
| | \$ | | \$ | | \$ |
| 1891..... | 2,881 | 1899..... | 2,733 | 1907..... | 9,618 |
| 1892..... | 938 | 1900..... | 3,296 | 1908..... | 34,591 |
| 1893..... | 1,172 | 1901..... | 1,514 | 1909..... | 113,362 |
| 1894..... | 482 | 1902..... | 2,267 | 1910..... | 12,914 |
| 1895..... | 937 | 1903..... | 2,851 | 1911..... | 4,067 |
| 1896..... | 1,328 | 1904..... | 5,494 | 1912..... | 2,436 |
| 1897..... | 644 | 1905..... | 3,143 | 1913..... | 1,739 |
| 1898..... | 2,117 | 1906..... | 7,551 | 1914..... | 2,223 |

Imports of Cement.

| Fiscal Year. | Cement and Mfrs. of N.E.S.* | Hydraulic cement.† | | | Portland cement. | | |
|----------------|-----------------------------|--------------------|--------|----------------|------------------|-----------|----------------|
| | | Quantity. | Value. | Average value. | Quantity. | Value. | Average value. |
| | \$ | Barrels. | \$ | \$ cts. | Barrels. | \$ | \$ cts. |
| 1880..... | 28 | 10,034 | 10,306 | 1 03 | ..... | 55,774 | ..... |
| 1881..... | 298 | 7,812 | 7,821 | 1 00 | ..... | 45,646 | ..... |
| 1882..... | 86 | 11,945 | 13,410 | 1 12 | ..... | 66,579 | ..... |
| 1883..... | 548 | 11,659 | 13,755 | 1 18 | ..... | 102,537 | ..... |
| 1884..... | 1,236 | 8,606 | 9,514 | 1 11 | ..... | 102,857 | ..... |
| 1885..... | 1,315 | 5,613 | 5,396 | 0 96 | ..... | 111,521 | ..... |
| 1886..... | 1,851 | 6,164 | 6,028 | 0 98 | ..... | 120,398 | ..... |
| 1887..... | 1,419 | 6,160 | 8,784 | 1 43 | 102,750 | 148,054 | 1 44 |
| 1888..... | 5,787 | 5,636 | 7,522 | 1 33 | 122,402 | 177,158 | 1 45 |
| 1889..... | 10,668 | 5,835 | 7,467 | 1 28 | 122,273 | 179,406 | 1 47 |
| 1890..... | 5,443 | 5,440 | 9,048 | 1 66 | 192,322 | 313,572 | 1 63 |
| 1891..... | 2,890 | 3,515 | 6,152 | 1 75 | 183,728 | 304,648 | 1 66 |
| 1892..... | 3,394 | 2,214 | 2,782 | 1 26 | 187,233 | 281,553 | 1 50 |
| 1893..... | 2,909 | 4,896 | 8,060 | 1 65 | 229,492 | 316,179 | 1 38 |
| 1894..... | 2,618 | 1,054 | 985 | 0 93 | 224,150 | 280,841 | 1 25 |
| 1895..... | 2,112 | 5,333 | 7,001 | 1 31 | 196,281 | 242,813 | 1 24 |
| 1896..... | 3,672 | 5,688 | 8,948 | 1 57 | 204,407 | 242,409 | 1 19 |
| 1897..... | 4,318 | 2,494 | 3,937 | 1 58 | 210,871 | 252,587 | 1 20 |
| | | Cwt. | | | Cwt. | | |
| 1898..... | 3,263 | 16,033 | 7,097 | 0 44 | 1,073,058 | 355,264 | 0 33 |
| 1899..... | 8,929 | 1,678 | 694 | 0 41 | 1,300,424 | 467,994 | 0 36 |
| 1900..... | 10,452 | 10,418 | 4,711 | 0 45 | 1,301,361 | 498,607 | 0 38 |
| 1901..... | 4,890 | 17,784 | 6,865 | 0 39 | 1,612,432 | 654,595 | 0 41 |
| 1902..... | 12,234 | 29,585 | 17,755 | 0 60 | 1,971,616 | 833,657 | 0 42 |
| 1903..... | 16,281 | 13,690 | 6,333 | 0 46 | 2,316,853 | 868,131 | 0 37 |
| 1904..... | 14,305 | 12,088 | 5,391 | 0 45 | 2,476,388 | 995,017 | 0 40 |
| 1905..... | 18,489 | 16,961 | 10,690 | 0 63 | 4,228,394 | 1,234,649 | 0 29 |
| 1906..... | 27,858 | 10,794 | 4,034 | 0 37 | 2,848,582 | 963,839 | 0 34 |
| 1907..... | 16,201 | 1,192 | 685 | 0 57 | 1,551,493 | 523,120 | 0 34 |
| 1908..... | 12,418 | 18,860 | 6,710 | 0 36 | 2,427,381 | 852,041 | 0 35 |
| 1909..... | 5,733 | 438 | 466 | 1 06 | 1,460,850 | 475,676 | 0 33 |
| Calendar Year. | | | | | | | |
| 1910..... | 7,718 | 365 | 349 | 0 96 | 1,222,586 | 468,046 | 0 38 |
| 1911..... | 7,430 | 26,655 | 6,107 | 0 23 | 2,316,707 | 834,879 | 0 36 |
| 1912..... | 9,698 | † | ..... | ..... | 5,020,446 | 1,969,529 | 0 39 |
| 1913..... | 17,729 | † | ..... | ..... | 889,324 | 409,303 | 0 46 |
| 1914..... | 12,533 | † | ..... | ..... | 343,076 | 147,158 | 0 43 |

*Cement not elsewhere specified and manufactures of cement.

†From 1912 included in Portland cement.

Consumption of Cement:—The consumption of cement is represented practically by the domestic production together with the imports, the exports being so comparatively small as to be negligible. The total con-

sumption of cement in Canada in 1914 was 7,270,502 barrels (1,272,338 tons), made up of 7,172,480 barrels (1,255,184 tons) of Canadian cement, and 98,022 barrels (17,154 tons) of imported cement, the Canadian cement representing 98·7 per cent and the imported cement 1·3 per cent of the total.

In 1913 the total consumption of cement was 8,912,898 barrels (1,559,-757 tons) made up of 8,658,805 barrels (1,515,291 tons) of Canadian cement, and 254,093 barrels (44,466 tons) of imported cement, the Canadian cement representing 97·1 per cent and the imported cement 2·9 per cent of the total.

In 1912 the total consumption of cement was 8,567,145 barrels (1,499,-250 tons) made up of 7,132,732 barrels (1,248,228 tons) of Canadian cement, and 1,434,413 barrels (251,022 tons) of imported cement, the Canadian cement representing 83·3 per cent, and the imported cement 16·7 per cent of the total.

Annual Consumption of Portland Cement.

| Calendar Year. | Canadian. | | Imported. | | Total. |
|----------------|-----------|-----------|-----------|-----------|-----------|
| | Barrels. | Per cent. | Barrels. | Per cent. | Barrels. |
| 1901..... | 317,066 | 36 | 555,900 | 64 | 872,966 |
| 1902..... | 594,594 | 52 | 544,954 | 48 | 1,139,548 |
| 1903..... | 627,741 | 45 | 773,678 | 55 | 1,401,419 |
| 1904..... | 910,358 | 54 | 784,630 | 46 | 1,694,988 |
| 1905..... | 1,346,548 | 59 | 918,701 | 41 | 2,265,249 |
| 1906..... | 2,119,764 | 76 | 665,845 | 24 | 2,785,609 |
| 1907..... | 2,436,093 | 78 | 672,630 | 22 | 3,108,723 |
| 1908..... | 2,665,289 | 85 | 469,049 | 15 | 3,134,338 |
| 1909..... | 4,067,709 | 97 | 142,194 | 3 | 4,209,903 |
| 1910..... | 4,753,975 | 93 | 349,310 | 7 | 5,103,285 |
| 1911..... | 5,692,915 | 90 | 661,916 | 10 | 6,354,831 |
| 1912..... | 7,132,732 | 83·3 | 1,434,413 | 16·7 | 8,567,145 |
| 1913..... | 8,658,805 | 97·1 | 254,093 | 2·9 | 8,912,898 |
| 1914..... | 7,172,480 | 98·7 | 98,022 | 1·3 | 7,270,502 |

Nova Scotia:—There is but one cement plant in Nova Scotia located at Sydney and operated by the Sydney Cement Company, Limited. Puz-zolan cement is made from blast furnace slag and lime.

Quebec:—This Province has three completed cement mills all operated by the Canada Cement Company, Limited; two situated near Montreal at Longue Pointe and Pointe aux Trembles, and the third in Hull. The Montreal mills have now a combined capacity of 13,800 barrels per day and the Hull mill 2,800 barrels per day. The total quantity of cement sold or used by producers during 1914 in this Province was 2,846,061 barrels valued at \$3,331,601.

Ontario:—Ontario continues as the most important cement producing province in Canada having sixteen completed plants with a total daily capacity of 18,700 barrels at the end of 1914 of which twelve were operated during the year, three of these for a few days only. Of the twelve plants operated five used limestone and seven marl. The four idle mills included one lime-

stone and three marl plants. The names of the operating companies and location of plants are shown in an accompanying list of producers.

The total sales of cement in Ontario during 1914 were 2,775,142 barrels valued at \$3,062,129, as compared with 3,992,988 barrels valued at \$4,311,183 in 1913. There was thus a decrease in sales of 1,217,846 barrels or about 31 per cent.

The detailed statistics of production during 1913 and 1914 are shown in the next table.

Cement Production in Ontario, 1913 and 1914.

| | 1913. | 1914. | Increase. | Per cent. | Decrease. | Per cent. |
|---|-----------|-----------|-----------|-----------|-----------|-----------|
| Cement sold or used.....Bls. | 3,992,988 | 2,775,142 | | | 1,217,846 | 30.5 |
| Cement manufactured....." | 4,007,202 | 3,183,053 | | | 824,149 | 20.6 |
| Stock on hand Jan. 1....." | 439,010 | 439,113 | 103 | | | |
| Stock on hand Dec. 31....." | 453,224 | 847,024 | 393,800 | 86.9 | | |
| Value of cement sold.....\$ | 4,311,183 | 3,062,129 | | | 1,249,054 | 28.9 |
| Wages paid....." | 1,098,197 | 721,287 | | | 376,910 | 34.3 |
| Men employed.....No. | 1,539 | 1,088 | | | 451 | 29.3 |
| Total daily capacity of operating plants.....Bls. | 17,750 | | | | | |

Manitoba:—The Commercial Cement Company of Winnipeg is operating a natural Portland cement plant at Babcock, 75 miles southwest of Winnipeg on the Canadian Northern railway. The capacity of the plant is reported as about 175 barrels per day. The Canada Cement Company completed and placed in operation its new plant near Winnipeg. This plant which was originally constructed as a clinker grinding mill was completed by the addition of a burning department. During 1913 all the cement produced at this plant was ground from clinker shipped from the Company's mill at Belleville, Ont. In the month of December, however, a commencement was made in the manufacture of clinker from raw materials obtained in the Province of Manitoba. The mill has a daily capacity of 3,500 barrels. Limestone is obtained from a property in township 28, range 10, west of the first meridian, and about 130 miles north of Winnipeg, on the Oak Point branch of the Canadian Northern railway.

Alberta:—Four cement plants were operated in this Province during 1914, located respectively at Exshaw, Calgary, Blairmore, and Marlboro, the first three being limestone plants and the last mentioned using marl. The mills at Exshaw and Calgary are operated by the Canada Cement Company and have a daily capacity of 4,500 barrels. The capacity of the mill at Blairmore, operated by the Rocky Mountains Cement Company is reported as having a daily capacity of 800 barrels. The new plant at Marlboro, 140 miles west of Edmonton, constructed to utilize the local marl deposits, has a daily capacity of 1,500 barrels. The total quantity of cement marketed by producers in 1914 was 641,395 barrels valued at \$1,212,342.

In addition to the completed plants, two others are in course of construction, one at Blairmore by the Keystone Portland Cement Company, and one at Dauntless, near Medicine Hat, by the Canada Cement Company; the latter plant is being planned for a capacity of 1,000,000 barrels per annum.

British Columbia.—Two plants were in operation in this Province in 1913. At Tod Inlet the Vancouver Portland Cement Company's mill has a capacity of from 2,500 to 3,000 barrels per day. The Associated Cement Company (Canada) Ltd., successors to the Portland Cement Construction Company, Ltd., operated the new plant at Bamberton, also on Tod Inlet during five months, the daily capacity of this plant being about 2,000 barrels. In both cases the limestone, clay and shale are obtained in the vicinity of the works.

The plant at Princeton constructed by the British Columbia Portland Cement Co., Ltd., capacity 500 to 700 barrels per day, was idle throughout 1914.

The total sales of cement from British Columbia mills in 1914 were 499,151 barrels valued at \$833,606.

The production of cement in Ontario has already been shown separately and the aggregate production in all other provinces during 1913 and 1914 is given in the next table.

Cement Production in Other Provinces, 1913 and 1914.

| — | 1913. | 1914. | Increase. | Per cent. | Decrease. | Per cent. |
|---|-----------|-----------|-----------|-----------|-----------|-----------|
| Cement sold or used.....Bls. | 4,665,817 | 4,397,338 | ..... | ..... | 268,479 | 5.75 |
| Cement manufactured....." | 4,879,131 | 5,544,216 | 665,085 | 13.6 | ..... | ..... |
| Stock on hand Jan. 1....." | 423,067 | 634,215 | 211,148 | 49.9 | ..... | ..... |
| Stock on hand Dec. 31....." | 636,371 | 1,781,093 | 1,144,722 | 179.9 | ..... | ..... |
| Value of cement sold.....\$ | 6,708,235 | 6,125,795 | ..... | ..... | 582,440 | 8.7 |
| Wages paid....." | 2,368,254 | 1,549,719 | ..... | ..... | 818,535 | 34.6 |
| Men employed.....No. | 2,737 | 1,889 | ..... | ..... | 848 | 31.0 |
| Total daily capacity of operating plants.....Bls. | 32,790 | 32,115 | ..... | ..... | 675 | 2.1 |

Following is a list of cement manufacturing companies:—

| Name. | Location of Plant. | Head Office. |
|---|---------------------------|-------------------|
| Sydney Cement Company, Ltd. | Sydney, N.S. | Sydney, N.S. |
| Canada Cement Company, Ltd:— | | Montreal, Que. |
| Montreal Mill No. 1. | Longue Pointe, Que. | |
| Montreal Mill No. 2. | Pt. aux Trembles, Que. | |
| International Mill, No. 3. | Hull, Que. | |
| Owen Sound Mill, No. 4. | Shallow Lake, Ont. | |
| Belleville Mill, No. 5. | Belleville, O. (Pt. Ann.) | |
| Lehigh Mill, No. 6. | " | |
| Lakefield Mill, No. 7. | Lakefield, Ont. | |
| Marlbank Mill, No. 8. | Marlbank, Ont. | |
| Port Colborne Mill, No. 9. | Port Colborne, Ont. | |
| Alberta Mill, No. 10. | Calgary, Alberta. | |
| †Dauntless Mill. | Dauntless, Alberta. | |
| Exshaw Mill, No. 12. | Exshaw, Alberta. | |
| Winnipeg Mill, No. 13. | Winnipeg, Man. | |
| The Union Portland Cement Co., Ltd. | Owen Sound, Ont. | Owen Sound, Ont. |
| *The Imperial Cement Co., Ltd. | " | " |
| Hanover Portland Cement Co., Ltd. | Hanover, Ont. | Hanover, Ont. |
| The Ontario Portland Cement Co., Ltd. | Blue Lake, Ont. | Brantford, Ont. |
| The National Portland Cement Co., Ltd. | Durham, Ont. | Durham, Ont. |
| Kirkfield Portland Cement Co., Ltd. | Raven Lake, Ont. | Toronto, Ont. |
| *Superior Portland Cement Co., Ltd. | Orangeville, Ont. | Orangeville, Ont. |
| *The Maple Leaf Portland Cement Co., Ltd. | Atwood, Ont. | Listowel, Ont. |
| *The Crown Portland Cement Co., Ltd. | Warton, Ont. | Toronto, Ont. |
| St. Marys Portland Cement Co., Ltd. | St. Marys, Ont. | " |
| The Commercial Cement Co., Ltd. | Babcock, Man. | Winnipeg, Man. |
| The Rocky Mountains Cement Co. | Blairmore, Alberta. | Calgary, Alberta. |
| †The Keystone Portland Cement Co. | " | " |
| The Edmonton Portland Cement Co., Ltd. | Marlboro, " | Edmonton, Alberta |
| Vancouver Portland Cement Co. | Tod Inlet, B.C. | Victoria, B.C. |
| *British Columbia Portland Cement Co., Ltd. | Princeton, East, B.C. | Vancouver, B.C. |
| The Associated Cement Co. (Canada) Ltd. | Bamberton, B.C. | Victoria, B.C. |

† Mill not yet completed. *Idle.

CLAYS AND CLAY PRODUCTS.¹

For a number of years a small quantity of fireclay has been produced and sold as such, and during the past two years there has been a small production of kaolin or china-clay from a deposit in the Province of Quebec. With these exceptions, practically all of the clay production in Canada is manufactured by the producer, and this report, therefore, treats almost altogether of the manufactured product.

The clay products made in Canada comprise brick of various kinds, including common and pressed, ornamental and fancy building brick, paving brick, firebrick, porous fireproofing brick and blocks, sewerpipe and drain tile, pottery and sanitary ware, the last two products chiefly from imported clays.

The total value of the clay products sold or marketed in 1914 was \$6,871,957, as compared with a value of \$9,504,314, in 1913, showing a decrease of \$2,632,357, or nearly 28 per cent. During the five years preceding 1913 the annual production of clay products increased very rapidly having more than doubled in that period. In 1913, however, the financial stringency affected building operations to such an extent as to greatly reduce the demand for building brick. There was actually a considerable increase in the quantity of common and pressed building brick manufactured during that year, but a large falling off in sales, so that large stocks of brick must have remained in manufacturers' hands at the close of the year. In 1914 there was a large falling off both in quantities of brick made and in quantities sold, and the stocks of common and pressed brick on hand at the end of the year were reported as 242,206,000, or about 44 per cent of the number sold during the year. There was an increase in the value of the sales of ornamental brick, sewerpipe, tiles, and also of kaolin, but a falling off in all other products including paving brick, firebrick, terra-cotta, fireproofing, and pottery. The average number of

¹ Special investigations of the clay resources of Canada have been undertaken by the Department of Mines for a number of years and several special reports have been published thereon. The first work was undertaken by J. Walter Wells in 1905, under the direction of Dr. Haanel. In 1909, Dr. Heinrich Ries, Professor of Economic Geology in Cornell University, was engaged by the Geological Survey to carry on a general investigation of Canadian clays. Mr. Joseph Keele of the Geological Survey was associated with Dr. Ries in the work which has been continued during the past five years.

The following reports have been published dealing with clays.

Mines Branch, Department of Mines:—

"Clays and Shales of Manitoba: Their Industrial Value," Report on. By J. Walter Wells, 1905. (Out of print).
Geological Survey Branch, Department of Mines:—
"The Clay and Shale Deposits of Nova Scotia and Portions of New Brunswick." By H. Ries and J. Keele, 1911.
"Preliminary Report on the Clay and Shale Deposits of the Western Provinces." By H. Ries and J. Keele, 1912.
"The Clay and Shale Deposits of the Western Provinces, Part II." By H. Ries and J. Keele, 1913.
"Clay and Shale Deposits of New Brunswick." By J. Keele, 1914.
"Clay and Shale Deposits of the Western Provinces, Part III." By Heinrich Ries, 1914.
"Preliminary Report on the Clay and Shale Deposits of the Province of Quebec." By J. Keele, 1915. Memoir No. 64.
"Clay and Shale Deposits of the Western Provinces, Part IV." By H. Ries, 1915. Memoir No. 65.
"Clay and Shale Deposits of the Western Provinces, Part V." By J. Keele, 1915. Memoir No. 66.

men employed in 1914 was 8,339, as compared with 11,193 in 1913, and 10,415 in 1912. The total wages paid in 1914 were \$3,201,380, as against \$4,682,801 in 1913, and \$4,488,957 in 1912.

Of the total value of the production in 1914, building and paving brick, including fireproofing, contributed \$5,258,179, or about 76·5 per cent, as against \$7,928,585 or 75 per cent of the total in 1913.

Sewerpipe and tile production in 1914 were valued at \$1,470,839, or 21 per cent of the total, as against \$1,374,458, or 13 per cent of the total in 1913. The total value of the production of pottery in 1914 was reported as \$312,846 of which \$35,371 only, is estimated as attributable to Canadian clays, and the balance to imported clays.

The value of the production of fireclays and fire brick from domestic clays was reported as \$107,568. Compared with the previous year the production of building, paving and fireproofing brick shows a further decrease of about 33·7 per cent, whereas the production of sewerpipe shows an increase of nearly 7 per cent.

The average price of common and building brick for the whole of Canada in 1914 was \$7·99 per M, as compared with \$8·85 in 1913; \$9·11 in 1912; \$8·37 in 1911; and \$8·13 in 1910. The average prices of pressed or front brick for the same years were respectively \$11·91; \$12·49; \$12·86; \$12·53; and \$11·89, thus showing a general increase in the cost of building brick until 1912, falling off again in 1913 and 1914.

Ontario is by far the largest producer of clay products, having contributed in 1914 nearly 58 per cent of the total values marketed, as compared with 55 per cent in 1913.

Quebec contributed 18·5 per cent in 1914, as against 17 per cent the preceding year; Alberta 6·7 per cent in 1914, as compared with 9·4 per cent in 1913; Manitoba 4·6 per cent in 1914, as against 5 per cent in 1913, and British Columbia 6 per cent in 1914 as compared with 7 per cent in the previous year.

There was a falling off in the total sales of clay products in every province except New Brunswick in which a small increase was shown. As in the previous year, the falling off was most pronounced in the western provinces. The total decrease in the eastern provinces, including Ontario, amounted to 22·7 per cent, while in the western provinces, including Manitoba, it was 43 per cent.

The following tables of production and of imports of clay products furnish comparisons of particular interest. In the first place an estimate of the value of consumption of clay products is furnished. The total value of the imports in 1914 was \$4,467,140 (not including certain items probably in part covering clay products) and after deducting a small export, a total approximate consumption of clay products valued at \$11,291,024 is shown of which about 61 per cent was of domestic production.

In 1913 the approximate consumption was valued at \$16,212,733 of which 58·6 per cent was of domestic production.

In 1912 the consumption was valued at \$17,149,659; in 1911, \$13,516,477; in 1910, \$11,958,591; and in 1909, \$9,696,324. In 1909 about 70 per cent of the consumption was of domestic production.

In the case of building brick the imports are small, compared with the home production, amounting to not much more than 5 per cent of the latter. The imports of paving brick are more than double and those of firebrick about seven times the Canadian production. The imports of drain tile and sewerpipe were about one-fourth the Canadian production.

Statistics of production in 1913 and 1914 of the several classes of clay products by provinces are shown in the following tables:—

Production of Clay Products by Provinces, 1914.

| Province. | No. of active firms reporting. | No. of men employed. | Wages. | Common brick. | | | Pressed brick. | | | | |
|-----------------------|--------------------------------|----------------------|-------------|---------------------------------------|--|-----------------|------------------|------------------------|----------------|-----------------------------|-----------|
| | | | | No. manu- factured. | No. sold. | Value of sales. | Per M. | No. manu- factured. | No. sold. | Value of sales. | Per M. |
| Nova Scotia..... | 11 | 337 | \$ 109,174 | 14,579,936 | 12,574,546 | \$ 97,510 | \$ cts. | 148,280 | 98,200 | \$ 1,502 | \$ cts. |
| New Brunswick..... | 8 | 107 | 26,977 | 5,584,000 | 6,033,528 | 64,042 | 7 75 | 200,000 | 100,000 | 2,250 | 15 32 |
| Quebec..... | 45 | 1,371 | 524,189 | 132,711,357 | 118,278,889 | 874,961 | 10 61 | 10,568,446 | 8,540,060 | 135,900 | 22 80 |
| Ontario..... | 282 | 4,727 | 1,946,581 | 300,721,629 | 249,896,642 | 1,963,921 | 7 40 | 90,003,675 | 72,153,067 | 777,199 | 15 91 |
| Manitoba..... | 13 | 464 | 119,838 | 21,072,050 | 26,777,950 | 289,060 | 7 86 | 1,603,000 | 2,258,000 | 28,428 | 10 77 |
| Saskatchewan..... | 14 | 370 | 72,152 | 11,485,600 | 6,865,000 | 61,669 | 10 79 | 2,235,000 | 1,850,000 | 32,030 | 12 59 |
| Alberta..... | 26 | 507 | 211,592 | 20,298,000 | 23,190,257 | 183,696 | 8 98 | 6,918,100 | 6,979,500 | 94,358 | 17 31 |
| British Columbia..... | 20 | 456 | 190,877 | 19,385,000 | 13,896,950 | 119,002 | 7 92 | 1,539,000 | 1,655,951 | 43,889 | 13 52 |
| Totals..... | 419 | 8,339 | 3,201,380 | 525,837,572 | 457,513,762 | 3,653,861 | 8 56 | 113,215,501 | 93,634,858 | 1,115,556 | 26 50 |
| | | | | | | | 7 99 | | | | 11 91 |
| Province. | Paving brick. | | Ornamental. | Firebrick and fireclay shapes. Value. | Fireproof- ing and terra-cotta, etc. Value. | Pottery. Value. | Sewerpipe Value. | Tiles, drain. Value. | Kaolin. Value. | Total value. Clay products. | |
| | No. sold. | Value. | | | | | | | | | No. sold. | Value. |
| Nova Scotia..... | | \$ | | \$ 13,204 | \$ 484 | \$ | \$ 149,420 | \$ 4,084 | \$ | \$ 266,204 | |
| New Brunswick..... |  | ..... |  | ..... | ..... | ..... | ..... | 210 | ..... | 66,502 | |
| Quebec..... |  | ..... |  | 160,960 | 45,753 | 2,395 | 176,629 | 1,260 | 10,000 | 1,267,700 | |
| Ontario..... | 2,566,000 | 47,534 | 1,121,236 | 4,824 | 15,978 | 32,976 | 593,606 | 343,662 | ..... | 3,979,606 | |
| Manitoba..... |  | ..... |  | ..... | ..... | ..... | ..... | ..... | ..... | 317,488 | |
| Saskatchewan..... |  | ..... |  | ..... | 4,650 | ..... | ..... | ..... | ..... | 98,349 | |
| Alberta..... | 7,000 | 245 | 272,300 | 3,264 | 96,025 | ..... | 83,036 | 1,575 | ..... | 462,199 | |
| British Columbia..... | 134,000 | 1,848 | ..... | 73,736 | 58,077 | ..... | 101,808 | 15,549 | ..... | 413,909 | |
| Totals..... | 2,707,000 | 49,627 | 1,554,496 | 23,592 | 405,543 | (a)35,371 | 1,104,499 | 366,340 | 10,000 | 6,871,957 | |

(a) There was also a production of \$277,475 in 1914.

(b) There was also a production of \$30,264 in 1914.

Production of Clay Products by Provinces, 1913.

| Province. | No. of ac- tive firms reporting. | No. of men employed. | Wages. | Common brick. | | | | Pressed brick. | | | | |
|-----------------------|--|----------------------------|------------|------------------------|-------------|--|---|------------------------|----------------------|--------------------|-------------------|--------------------------------------|
| | | | | No. manu- factured. | No. sold. | Value of sales. | Per M. | No. manu- factured. | No. sold. | Value of sales. | Per M. | |
| | | | | | | | | | | | | |
| Nova Scotia..... | 12 | 395 | \$ 123,554 | 25,052,866 | 21,923,573 | \$ 171,418 | \$ cts. | 175,186 | 162,192 | \$ 2,606 | \$ cts. | |
| New Brunswick..... | 8 | 173 | 34,540 | 7,158,240 | 6,139,152 | 171,369 | 7 83 | 50,000 | 50,000 | | 16 00 | |
| Quebec..... | 76 | 2,055 | 721,435 | 180,063,371 | 145,972,957 | 1,152,744 | 10 00 | 10,338,313 | 7,723,285 | 98,321 | 12 00 | |
| Ontario..... | 271 | 5,260 | 2,393,357 | 401,055,851 | 349,846,487 | 3,152,756 | 7 89 | 89,494,500 | 80,183,044 | 920,773 | 12 73 | |
| Manitoba..... | 17 | 1,134 | 283,143 | 67,078,850 | 39,559,320 | 3,443,498 | 8 88 | 6,031,079 | 4,101,000 | 70,860 | 11 48 | |
| Saskatchewan..... | 14 | 379 | 116,312 | 23,169,000 | 16,475,000 | 457,370 | 9 86 | 2,750,000 | 1,700,000 | 27,450 | 17 28 | |
| Alberta..... | 30 | 991 | 592,709 | 65,091,783 | 52,378,283 | 477,998 | 9 13 | 25,016,515 | 19,618,060 | 254,410 | 12 97 | |
| British Columbia..... | 27 | 806 | 417,751 | 43,919,240 | 36,131,903 | 343,020 | 9 49 | 5,728,907 | 3,264,472 | 83,713 | 25 65 | |
| Totals..... | 455 | 11,193 | 4,682,801 | 812,589,201 | 668,426,675 | 5,917,373 | 8 85 | 139,584,500 | 116,802,053 | 1,458,733 | 12 49 | |
| Province. | Paving brick. | No. sold. | Value. | Ornamental. | | Firebrick and fireclay shapes. Value. | Fireproof- ing and terra-cotta, etc. Value. | Pottery. Value. | Sewerpipe. Value. | Tiles, drain. | Kaolin. Value. | Total value. Clay products. |
| | | | | No. sold. | Value. | | | | | | | |
| | | | | | | | | | | | | |
| Nova Scotia..... | | | \$ | | \$ 17,173 | \$ | | \$ | 138,209 | 2,366 | \$ | \$ 332,272 |
| New Brunswick..... | | | | | | | | | | | | 62,269 |
| Quebec..... | | | 195,000 | 4,875 | 29,528 | 122,000 | 1,800 | 1,800 | 184,248 | 8,600 | 5,000 | 1,606,816 |
| Ontario..... | | | 635,855 | 9,810 | | 150,268 | 48,864 | 48,864 | 600,797 | 314,859 | | 5,220,467 |
| Manitoba..... | | | | | | | | | | | | 514,358 |
| Saskatchewan..... | | | 44,500 | 738 | | 146,200 | | | | | | 189,820 |
| Alberta..... | | | 3,000 | | | 461,919 | | 2,869 | 7,219 | 974 | | 893,408 |
| British Columbia..... | | | 2,829 | | 96,037 | 461,387 | | | 105,433 | 10,953 | | 684,904 |
| Totals..... | 4,208,295 | 75,669 | 875,355 | 15,423 | (b) 142,738 | 461,387 | | (a) 53,533 | 1,035,906 | 338,552 | 5,000 | 9,504,324 |

(a) There was also a production of \$315,383 from imported clays.

(b) There was also a production of \$22,925 from imported clays.

Production of Clay Products, 1911, and 1912.

| | 1911. | | | 1912. | | |
|---|-------------|-----------|---------|-------------|------------|---------|
| | Quantity. | Value. | Per M. | Quantity. | Value. | Per M. |
| | | \$ | \$ cts. | | \$ | \$ cts. |
| Bricks— | | | | | | |
| Common.....No. | 645,550,517 | 5,420,890 | 8 37 | 769,191,532 | 7,010,375 | 9 11 |
| Pressed....." | 87,350,539 | 1,094,582 | 12 53 | 125,180,422 | 1,609,854 | 12 86 |
| Paving....." | 5,220,400 | 79,444 | 15 22 | 4,579,500 | 85,989 | 18 78 |
| Ornamental..... | 605,643 | 11,281 | 18 63 | 371,356 | 8,595 | 23 15 |
| Firebrick and fireclay shapes, etc. | | 89,130 | | | 125,585 | |
| Fireproofing, and architectural terra-cotta, etc. | | 409,585 | | | 448,853 | |
| Pottery..... | | 102,493 | | | 43,955 | |
| Sewerpipe..... | | 812,716 | | | 884,641 | |
| Tiles, drain..... | | 339,812 | | | 357,862 | |
| Totals..... | | 8,359,933 | | | 10,575,709 | |

Production of Clay Products by Provinces, 1909-1914.

| Province. | 1909. | 1910. | 1911. | 1912. | 1913. | 1914. |
|-----------------------|-----------|-----------|-----------|------------|-----------|-----------|
| | \$ | \$ | \$ | \$ | \$ | \$ |
| Nova Scotia..... | 188,185 | 204,782 | 274,249 | 272,053 | 332,272 | 266,204 |
| New Brunswick..... | 65,570 | 56,475 | 38,000 | 54,910 | 62,269 | 66,502 |
| Quebec..... | 1,153,832 | 1,442,842 | 1,341,467 | 1,680,460 | 1,606,816 | 1,267,700 |
| Ontario..... | 3,425,841 | 3,667,810 | 3,916,575 | 4,864,700 | 5,220,467 | 3,979,606 |
| Manitoba..... | 559,008 | 781,605 | 834,428 | 1,018,051 | 514,358 | 317,488 |
| Saskatchewan..... | 145,516 | 160,850 | 226,958 | 332,943 | 189,820 | 98,349 |
| Alberta..... | 442,486 | 753,232 | 1,052,751 | 1,356,184 | 893,408 | 462,199 |
| British Columbia..... | 470,402 | 562,360 | 675,505 | 996,568 | 684,904 | 413,909 |
| | 6,450,840 | 7,629,956 | 8,359,933 | 10,575,869 | 9,504,314 | 6,871,957 |

Annual Value of Production of Clay Products, 1899-1914.

| Calendar Year. | Value. | Calendar Year. | Value. | Calendar Year. | Value. |
|----------------|-----------|----------------|-----------|----------------|------------|
| | \$ | | \$ | | \$ |
| 1899..... | 2,988,099 | 1904..... | 3,841,560 | 1909..... | 6,450,840 |
| 1900..... | 3,195,105 | 1905..... | 4,709,842 | 1910..... | 7,629,956 |
| 1901..... | 3,382,706 | 1906..... | 5,072,635 | 1911..... | 8,359,933 |
| 1902..... | 3,625,489 | 1907..... | 5,772,117 | 1912..... | 10,575,869 |
| 1903..... | 4,034,289 | 1908..... | 4,500,702 | 1913..... | 9,504,314 |
| | | | | 1914..... | 6,871,957 |

Exports and Imports:—The total value of the exports of clay products in 1914 was \$48,073, and included 1,486,000 building brick valued at \$11,871, manufactures of clay valued at \$26,866, and earthenware valued at \$9,336.

In 1913 the total value of the exports was \$52,333, which included 977,000 building brick valued at \$8,579, manufactures of clay valued at \$27,201, and earthenware valued at \$16,553.

Exports of Clay Products.

| Calendar Year. | Building brick. | | Manu- factures. | Earthen- ware. | Total. |
|----------------|-----------------|--------|--------------------|-------------------|--------|
| | M. | Value. | | | |
| | | \$ | \$ | \$ | \$ |
| 1910..... | 390 | 2,762 | 9,061 | 9,240 | 21,063 |
| 1911..... | 394 | 3,977 | 2,071 | 6,101 | 12,149 |
| 1912..... | 694 | 8,493 | 256 | 10,001 | 18,750 |
| 1913..... | 977 | 8,579 | 27,201 | 16,553 | 52,333 |
| 1914..... | 1,486 | 11,871 | 26,866 | 9,336 | 48,073 |

The imports of clays and clay products reached a total value, during the calendar year 1914, of \$4,467,140, or equivalent to about 66 per cent of the domestic production. The total imports in 1913 were valued at \$6,760,752 or about 71 per cent of the domestic production. The decrease in value of imports in 1914 was \$2,293,612, or nearly 34 per cent.

Clay imports are classified by the Department of Customs under three main subdivisions, including: brick and tile; earthenware and chinaware; and clays. The imports of clays in 1914 were valued at \$288,128 and included chiefly china-clay and fireclay with a small quantity of pipeclay and other clays not classified. The value of china-clay imported was \$150,881 and of fireclay \$90,233, the former an increase, the latter a decrease from the imports of the previous year. In 1913 the total value of the imports of clays was \$324,290 and included china-clay valued at \$149,337 and fireclay at \$143,399. The imports of these clays have varied considerably from year to year and the present imports of china-clay are the highest record, while the imports of fireclay were the lowest since 1909.

The imports classified under brick and tile were valued in 1914 at \$1,986,790 as compared with a value of \$3,121,592 in 1913. A large portion of these imports are made up of firebrick, nearly 35 per cent in 1914. There is also a considerable import of building and paving brick, of sewerpipe and drain tile, and of building blocks, and manufactures of clay not specified.

The imports of earthenware and chinaware, of which the most important class is tableware, were valued in 1914 at \$2,192,222, as against \$3,314,870 in 1913. These imports are chiefly of a class of goods not manufactured in Canada and for which the raw materials are not as yet obtainable from Canadian sources.

The detailed record of imports during the calendar years 1909 to 1914 is shown in the next table.

Imports of Clay Products, Calendar Years 1909 to 1914.

| Imports. | | 1909. | 1910. | 1911. | 1912. | 1913. | 1914. |
|---|--|------------------|------------------|------------------|------------------|------------------|------------------|
| | | \$ | \$ | \$ | \$ | \$ | \$ |
| Brick and tile:— | | | | | | | |
| Bath brick..... | | 1,495 | 2,290 | 2,623 | 1,927 | 2,690 | 1,894 |
| Building brick..... | | 195,360 | 274,482 | 475,865 | 763,470 | 575,269 | 353,353 |
| Paving brick..... | | 139,366 | 134,994 | 164,292 | 160,663 | 176,497 | 145,067 |
| Firebrick, of a class or kind not made in Canada..... | | 485,994 | 811,927 | 814,414 | 935,621 | 976,097 | 535,712 |
| Drain tile, not glazed..... | | 2,785 | 4,485 | 5,640 | 4,018 | 12,156 | 2,941 |
| Drain pipe, sewerpipe, and earthenware fittings therefor, chimney linings or vents, chimney tops and inverted blocks, glazed or unglazed..... | | 170,280 | 175,599 | 382,929 | 507,024 | 465,997 | 338,533 |
| Manufactures of clay, n.o.p..... | | 254,170 | 361,996 | 523,998 | 818,467 | (a)912,886 | (b)609,294 |
| Total..... | | 1,249,450 | 1,755,773 | 2,369,761 | 3,209,190 | 3,121,592 | 1,986,790 |
| Earthenware and chinaware..... | | | | | | | |
| Brown or coloured earthenware and stoneware, and Rockingham ware..... | | 36,673 | 53,413 | 52,100 | 62,161 | 70,632 | 71,083 |
| C. C. or cream coloured ware, decorated, printed or sponged, and all earthenware, n.o.p..... | | 210,936 | 202,475 | 184,231 | 221,804 | 264,090 | 163,431 |
| Demijohns, churns or crocks..... | | 8,888 | 10,475 | 10,582 | 18,404 | 28,595 | 35,435 |
| Tableware of china, porcelain, white granite or iron-stoneware..... | | 1,212,367 | 1,545,538 | 1,748,582 | 2,068,722 | 2,183,601 | 1,437,178 |
| China and porcelain ware, n.o.p..... | | 57,467 | 95,508 | 63,022 | 71,751 | 30,753 | 30,006 |
| Tiles or blocks of earthenware or stone prepared for mosaic flooring..... | | 56,974 | 90,524 | 133,203 | 160,082 | 173,445 | 104,285 |
| Earthenware tiles, n.o.p..... | | 81,393 | 135,772 | 154,351 | 239,391 | 296,791 | 186,161 |
| Manufactures of earthenware, n.o.p..... | | 78,063 | 163,278 | 217,051 | 183,001 | 248,016 | 174,146 |
| Total..... | | 1,781,759 | 2,283,116 | 2,516,536 | 3,094,956 | 3,314,870 | 2,192,222 |
| Clays:— | | | | | | | |
| China-clay ground, or unground..... | | 100,066 | 142,125 | 125,768 | 127,402 | 149,337 | 150,881 |
| Fireclay, ground or unground..... | | 86,161 | 124,293 | 125,199 | 140,500 | 143,399 | 90,233 |
| Pipeclay, ground or unground..... | | 310 | 114 | 1,786 | 234 | 385 | 829 |
| Clays, all other, n.o.p..... | | 29,793 | 25,976 | 17,494 | 20,258 | 31,169 | 46,185 |
| Totals..... | | 216,330 | 292,508 | 270,247 | 288,394 | 324,290 | 288,128 |
| Grand total..... | | 3,247,539 | 4,331,397 | 5,156,544 | 6,592,540 | 6,760,752 | 4,467,140 |
| Baths, bath-tubs, basins, closets, lavatories, urinals, sinks and laundry tubs of any material..... | | 211,837 | 262,667 | 285,847 | 382,920 | 477,133 | 359,288 |
| Chalk, china or Cornwall stone, cliff stone and feldspar, fluorspar, magnesite, ground or unground | | 96,747 | 121,959 | 147,640 | 167,990 | 164,879 | 113,211 |

(a) Includes Building Blocks (9 mos.) \$356,366; Firebrick, n.o.p. (9 mos.) \$216,760; and manufactures of clay, n.o.p., \$339,760.
 (b) Includes Building Blocks (12 mos.) \$276,817; Firebrick, n.o.p. (12 mos.) \$154,421; and manufactures of clay, n.o.p., \$178,056.

In addition to the imports of clay products there is also shown in the preceding table a considerable annual importation of 'chalk, china or corn-wall stone, cliff stone and feldspar, fluorspar, magnesite ground or unground,' much of which is no doubt used in connexion with the manufacture of clay products. The value of these imports during the calendar year 1914 was \$113,211; of which \$104,212 was from the United States, \$5,396 from Great Britain, and \$3,603 from other countries. The value of the imports under this item during the calendar year 1913 was \$164,879. There is also shown an annual importation of 'baths, bath-tubs, basins, closets, lavatories, urinals, sinks, and laundry tubs of any material,' the value of such imports during 1914 being \$359,288, as compared with \$477,133 during the year 1913.

Imported clay products are derived chiefly from Great Britain and the United States, although considerable quantities of earthenware, china and poreclain ware, white granite or iron-stoneware, etc., are brought from Germany, France, Austria-Hungary, and Japan. The imports during the fiscal year, showing the country of origin, are shown in the next table. Of the brick and tile imported 84 per cent was from the United States and 15.6 per cent from Great Britain; and only \$11,079 worth from other countries. Of the earthenware and chinaware, 60 per cent was imported from Great Britain; 18 per cent from the United States; 10 per cent from Germany; 6 per cent from France; 3 per cent from Japan, and considerable values also from Austria-Hungary, and other countries. The crude clays were imported principally from Great Britain and the United States.

Imports of Clay Products During the Twelve Months Ending March 1914, Showing Countries of Origin.

| Imports. | Total. | | | | | |
|---|----------------|----------------|----------|---------|------------------|---------|
| | Great Britain. | United States. | Germany. | France. | Austria-Hungary. | Japan. |
| Other countries. | Total. | | | | | |
| | Great Britain. | United States. | Germany. | France. | Austria-Hungary. | Japan. |
| Brick and tile:— | | | | | | |
| Bath brick..... | \$ 2,598 | \$ 226 | | | | |
| Building brick..... | 28,067 | 499,596 | | | | |
| Building blocks..... | 50,930 | 375,796 | | | | |
| Paving brick..... | 73,146 | 98,471 | | 194 | | |
| Fire brick, of a class or kind not made in Canada..... | 130,179 | 743,860 | 2,106 | 2,967 | | |
| Fire brick, n.o.p..... | 82,094 | 176,286 | | 965 | | |
| Drain tile, not glazed..... | 3,186 | 6,937 | | 1,083 | | |
| Drain pipe, sewerpipe, and earthenware fittings therefor, chimney linings or vents, chimney tops and inverted blocks, glazed or unglazed..... | 54,696 | 399,830 | 1,502 | 312 | | |
| Manufactures of clay, n.o.p..... | 34,646 | 206,539 | | | 242 | |
| Total..... | 459,542 | 2,477,541 | 3,608 | 5,471 | 242 | |
| Earthenware and chinaware:— | | | | | | |
| Brown or coloured earthenware and stoneware, and Rockingham ware | 21,501 | 51,585 | 364 | 169 | | 42 |
| C. C. or cream coloured ware, decorated, printed or sponged, and all earthenware, n.o.p..... | 174,499 | 46,444 | 23,333 | 2,646 | 2,318 | 11,214 |
| Demijohns, churns, or crocks..... | 2,127 | 27,993 | 30 | 8 | 57 | |
| Tableware of china, porcelain, white granite or iron-stoneware | 1,425,593 | 40,871 | 258,702 | 180,199 | 71,060 | 82,712 |
| China ware to be silver mounted, imported by manufacturers of silverware | 1,217 | 357 | | 15 | | |
| China and porcelain ware, n.o.p..... | 15,949 | 11,592 | 7,184 | 1,142 | 449 | 2,956 |
| Tiles or blocks of earthenware or stone prepared for mosaic flooring | 31,196 | 125,409 | 637 | 2,410 | | |
| Earthenware tiles, n.o.p..... | 145,012 | 124,464 | 318 | 814 | 149 | |
| Manufactures of earthenware, n.o.p..... | 56,505 | 142,597 | 9,394 | 2,184 | 283 | 5,507 |
| Total..... | 1,873,599 | 571,312 | 299,962 | 189,587 | 74,950 | 102,431 |
| Clays:— | | | | | | |
| China-clay, ground or unground..... | 66,211 | 96,251 | | | | |
| Fireclay, ground or unground..... | 24,136 | 100,676 | 622 | | | |
| Pipeclay, ground or unground..... | 252 | 237 | | | | |
| Clays, all other, n.o.p..... | 1,589 | 29,721 | 7 | | | |
| Total..... | 92,188 | 226,885 | 629 | | | |
| Grand total..... | 2,425,329 | 3,275,738 | 304,199 | 195,058 | 75,192 | 102,431 |
| Per cent of total..... | 37.90 | 51.19 | 4.75 | 3.05 | 1.17 | 1.60 |
| Baths, bath-tubs, basins, closets, lavatories, urinals, sinks, and laundry tubs of any material..... | 163,089 | 288,714 | 37 | 815 | | |
| Chalk, china or Cornwall stone, cliff stone, and feldspar, flint, magnesite, ground or unground..... | 21,322 | 149,963 | 1,337 | 326 | 80 | |
| Total..... | | | | | | |
| Grand total..... | | | | | | |
| Per cent of total..... | | | | | | |
| Baths, bath-tubs, basins, closets, lavatories, urinals, sinks, and laundry tubs of any material..... | | | | | | |
| Chalk, china or Cornwall stone, cliff stone, and feldspar, flint, magnesite, ground or unground..... | | | | | | |
| Total..... | | | | | | |
| Grand total..... | | | | | | |
| Per cent of total..... | | | | | | |

A record of the total annual value of the imports of clay products since 1900 is shown in the following table.

Imports of Clay Products (total value) 1900-14.

| Fiscal Year. | Brick and tile.** | Earthenware and chinaware. | Clays. | Totals. |
|----------------|-------------------|----------------------------|---------|-----------|
| | \$ | \$ | \$ | \$ |
| 1900..... | 145,914 | 959,526 | 122,965 | 1,228,405 |
| 1901..... | 133,343 | 1,114,677 | 141,251 | 1,389,271 |
| 1902..... | 172,281 | 1,275,093 | 140,521 | 1,587,895 |
| 1903..... | 157,783 | 1,406,610 | 176,416 | 1,740,809 |
| 1904..... | 259,421 | 1,611,356 | 144,706 | 2,015,483 |
| 1905..... | 761,756 | 1,636,214 | 176,805 | 2,574,775 |
| 1906..... | 1,000,372 | 1,692,359 | 220,504 | 2,913,235 |
| 1907*..... | 770,686 | 1,422,880 | 178,240 | 2,371,806 |
| 1908..... | 1,079,556 | 2,190,784 | 267,720 | 3,538,060 |
| Calendar Year. | | | | |
| 1909..... | 1,249,450 | 1,781,759 | 216,330 | 3,247,539 |
| 1910..... | 1,755,773 | 2,283,116 | 292,508 | 4,331,397 |
| 1911..... | 2,369,761 | 2,516,536 | 270,247 | 5,156,544 |
| 1912..... | 3,209,190 | 3,094,956 | 288,394 | 6,592,540 |
| 1913..... | 3,121,592 | 3,314,870 | 324,290 | 6,760,752 |
| 1914..... | 1,986,790 | 2,192,222 | 288,128 | 4,467,140 |

* 9 months ending March, 1907.

** Includes fireclay classified as "for use in process of manufactures."

The Canadian Customs duties affecting clays and clay products, in force during 1914, are shown as follows:—

Canadian Customs Duties on Clay Products.

(From the Customs Tariff, 1907, revised 1910).

| Item. | British Preferential tariff. | Inter-mediate tariff. | General tariff. |
|--|------------------------------|-----------------------|-----------------|
| 281 Firebrick of a class or kind not made in Canada..... | Free. | Free. | Free. |
| 282 Building brick, paving brick, and mfgs. of clay or cement (n.o.p.) | 12½ % | 20 % | 22½ % |
| 283 Drain tiles not glazed..... | 15 | 17½ | 20 |
| 284 Drain pipes, sewerpipes, and earthenware fittings therefor, chimney linings or vents, chimney tops and inverted blocks glazed or unglazed, earthenware tiles (n.o.p.)..... | 25 " | 32½ " | 35 " |
| 285 Tiles or blocks of earthenware or of stone prepared for mosaic flooring..... | 20 " | 27½ " | 30 " |
| 286 Earthenware and stoneware, viz., demijohns, churns, or crocks.... | 20 " | 27½ " | 30 " |
| 287 Tableware of china, porcelain, white granite or ironstone..... | 15 " | 27½ " | 27½ " |
| 288 Earthenware and stoneware, brown or coloured and Rockingham ware "C.C." or cream coloured ware, decorated, printed or sponged, and all earthenware (n.o.p.)..... | 20 " | 27½ " | 30 " |
| 289 Closets, urinals, basins, lavatories, baths, bath-tubs, sinks, and laundry tubs of earthenware, stone, cement or clay or of other material..... | 20 " | 30 " | 35 " |
| 295 Clays, including china-clays, fireclay and pipe-clay, not further manufactured than ground; ganister and sand; gravels; earths, crude only..... | Free. | Free. | Free |

CLAY BUILDING BRICK.

The total sales from Canadian plants of clay building brick including the common and pressed brick, but excluding ornamental, paving, firebrick, and fireproofing brick, are shown by provinces, for the past four years, in the following tables:—

In 1914 the total sales were 551,148,620, valued at \$4,769,417, made up of 457,513,762 common, valued at \$3,653,861, or an average value per thousand of \$7.99; and 93,634,858 pressed brick, valued at \$1,115,556, or an average value per thousand of \$11.91. In addition to the common and pressed brick there was a production of ornamental brick of 1,554,496, valued at \$23,592, and a production of fireproofing brick and architectural terra-cotta valued at \$405,543.

In 1913 the total sales were 785,228,728 brick, valued at \$7,376,106, made up of 668,426,675 common, valued at \$5,917,373 or an average value per thousand of \$8.85; and 116,802,053 pressed brick, valued at \$1,458,733 or an average value per thousand of \$12.49. In addition to the common and pressed brick there were sales of ornamental brick of 875,355 valued at \$15,423, and of fireproofing brick and architectural terra-cotta valued at \$461,387.

In 1912 the total sales were 894,371,954, valued at \$8,620,229, made up of 769,191,532 common, valued at \$7,010,375, or an average value per thousand of \$9.11; and 125,180,422 pressed brick, valued at \$1,609,854, or an average value per thousand of \$12.86. In addition to the common and pressed brick, there was a production of ornamental brick of 371,356 valued at \$8,595, and a production of fireproofing brick and architectural terra-cotta valued at \$448,853.

Production of Clay Building Brick (Common and Pressed) 1913 and 1914.

| Province. | 1913. | | | | 1914. | | | |
|-------------------|--------------------------------|-------------|-----------|--------------------------|--------------------------------|-------------|-----------|--------------------------|
| | No. of active firms reporting. | No. sold. | Value. | Per cent of total value. | No. of active firms reporting. | No. sold. | Value. | Per cent of total value. |
| | | | \$ | | | | \$ | |
| Nova Scotia..... | 12 | 22,085,765 | 174,024 | 2.3 | 11 | 12,672,826 | 99,012 | 2.1 |
| New Brunswick .. | 8 | 6,189,152 | 61,969 | 0.8 | 8 | 6,133,528 | 66,292 | 1.4 |
| Quebec..... | 76 | 153,696,242 | 1,250,765 | 17.0 | 45 | 126,818,949 | 1,010,861 | 21.2 |
| Ontario..... | 271 | 430,029,531 | 4,026,029 | 54.6 | 282 | 322,049,709 | 2,741,120 | 57.5 |
| Manitoba..... | 17 | 43,660,320 | 514,358 | 7.0 | 13 | 29,035,950 | 317,488 | 6.7 |
| Saskatchewan.... | 14 | 18,175,000 | 189,820 | 2.6 | 14 | 8,715,000 | 93,699 | 1.9 |
| Alberta..... | 30 | 71,996,343 | 732,408 | 9.9 | 26 | 30,169,757 | 278,054 | 5.8 |
| British Columbia. | 27 | 39,396,375 | 426,733 | 5.8 | 20 | 15,552,901 | 162,891 | 3.4 |
| Totals..... | 455 | 785,228,728 | 7,376,106 | 100.0 | 419 | 551,148,620 | 4,769,417 | 100.0 |

Production of Clay Building Brick (Common and Pressed) 1911 and 1912.

| Province. | 1911. | | | 1912. | | |
|-----------------------|-------------|-----------|--------------------------|-------------|-----------|--------------------------|
| | No. sold. | Value. | Per cent of total value. | No. sold. | Value. | Per cent of total value. |
| | | \$ | | | \$ | |
| Nova Scotia..... | 23,530,000 | 141,640 | 2.17 | 18,822,960 | 130,108 | 1.5 |
| New Brunswick..... | 4,400,000 | 38,000 | 0.58 | 5,780,000 | 53,350 | 0.6 |
| Quebec..... | 122,041,580 | 1,033,270 | 15.86 | 173,336,557 | 1,446,880 | 16.8 |
| Ontario..... | 369,004,371 | 3,028,046 | 46.48 | 423,670,184 | 3,807,195 | 44.2 |
| Manitoba..... | 81,400,000 | 826,928 | 12.69 | 87,178,937 | 1,012,801 | 11.7 |
| Saskatchewan..... | 21,071,660 | 224,758 | 3.45 | 30,538,771 | 332,943 | 3.9 |
| Alberta..... | 71,772,930 | 779,001 | 11.96 | 93,759,980 | 1,105,912 | 12.8 |
| British Columbia..... | 39,680,515 | 443,829 | 6.81 | 61,284,565 | 731,040 | 8.5 |
| Totals..... | 732,901,056 | 6,515,472 | 100.00 | 894,371,954 | 8,620,229 | 100.0 |

Very large stocks of brick were reported as being in manufacturers' hands at the close of 1914, the total number being 242,206,000 brick or equivalent to about 44 per cent of the year's sales.

The record of stocks on hand by provinces is shown in the following table:—

Common and Pressed Brick held in Stock by Manufacturers, December 31, 1914.

| Province. | Common brick. | Pressed brick. | Total. |
|-----------------------|---------------|----------------|-------------|
| | No. | No. | No. |
| Nova Scotia..... | 4,690,000 | 50,000 | 4,740,000 |
| New Brunswick..... | 2,830,000 | 100,000 | 2,930,000 |
| Quebec..... | 42,494,000 | 2,851,000 | 45,345,000 |
| Ontario..... | 107,325,000 | 23,369,000 | 130,694,000 |
| Manitoba..... | 20,140,000 | 760,000 | 21,000,000 |
| Saskatchewan..... | 7,503,000 | 1,140,000 | 8,643,000 |
| Alberta..... | 10,483,000 | 8,549,000 | 19,032,000 |
| British Columbia..... | 8,264,000 | 1,558,000 | 9,822,000 |
| Total..... | 203,729,000 | 38,377,000 | 242,206,000 |

The exports of building brick since 1891 and the imports since 1880 are shown in the following tables. The exports have never been large, averaging for a number of years about \$6,000 per annum. The exports fell off somewhat from 1909 to 1911, but increased again to a value of \$11,871 in 1914.

The annual imports for a number of years previous to 1903 averaged only about \$20,000 in value; during the past ten years, however, the imports have rapidly increased from \$100,000 to over \$760,000 in 1912. During

the calendar year 1914 the imports were 30,022,000 brick, valued at \$353,353, of which 1,794,000 valued at \$20,505, or an average of \$11.43 per thousand, were imported from Great Britain, and 28,228,000 valued at \$332,848 or an average of \$11.79 per thousand, from the United States. The imports during the year 1913 were 56,846,000 brick valued at \$575,269, of which 2,427,000, valued at \$28,645, or an average of \$11.80 per thousand, were imported from Great Britain, and 54,419,000 valued at \$546,624, or an average of \$10.04 per thousand, from the United States. In both 1913 and 1914 there was a considerable falling off in the imports of brick from Great Britain and the United States, and an increase in the average price of the brick imported.

Exports of Building Brick.

| Calendar Year. | M. | Value. | Calendar Year. | M. | Value. | Calendar Year. | M. | Value. |
|----------------|-------|--------|----------------|-------|--------|----------------|-------|--------|
| | | \$ | | | \$ | | | \$ |
| 1891..... | 246 | 1,163 | 1899..... | 172 | 1,351 | 1907..... | 802 | 6,193 |
| 1892..... | 1,963 | 12,192 | 1900..... | 546 | 4,528 | 1908..... | 2,344 | 9,047 |
| 1893..... | 6,073 | 44,110 | 1901..... | 646 | 5,189 | 1909..... | 365 | 2,255 |
| 1894..... | 1,095 | 7,405 | 1902..... | 2,110 | 12,786 | 1910..... | 390 | 2,762 |
| 1895..... | 1,655 | 8,665 | 1903..... | 891 | 5,699 | 1911..... | 394 | 3,977 |
| 1896..... | 983 | 5,678 | 1904..... | 696 | 5,357 | 1912..... | 694 | 8,493 |
| 1897..... | 573 | 2,679 | 1905..... | 754 | 5,888 | 1913..... | 977 | 8,579 |
| 1898..... | 65 | 442 | 1906..... | 697 | 6,541 | 1914..... | 1,486 | 11,871 |

Imports of Building Brick.

| Fiscal Year. | M. | Value. | Fiscal Year. | M. | Value. | Fiscal Year. | M. | Value. |
|--------------|-------|--------|--------------|-------|--------|----------------|--------|---------|
| | | \$ | | | \$ | | | \$ |
| 1880..... | 340 | 2,067 | 1892..... | 621 | 5,075 | 1904..... | 13,455 | 117,468 |
| 1881..... | 415 | 4,281 | 1893..... | 1,489 | 14,108 | 1905..... | 25,515 | 168,122 |
| 1882..... | 3,500 | 24,572 | 1894..... | 2,220 | 18,320 | 1906..... | 21,934 | 194,897 |
| 1883..... | 1,448 | 14,234 | 1895..... | 575 | 4,705 | 1907 (9 mos.) | 8,495 | 88,144 |
| 1884..... | 3,263 | 20,258 | 1896..... | 1,057 | 23,189 | 1908..... | 13,790 | 139,105 |
| 1885..... | 3,108 | 14,632 | 1897..... | 2,094 | 10,336 | 1909..... | 10,894 | 103,773 |
| 1886..... | 983 | 5,929 | 1898..... | 639 | 6,652 | Calendar Year. | | |
| 1887..... | 276 | 2,440 | 1899..... | 2,611 | 21,306 | 1910..... | 29,049 | 274,482 |
| 1888..... | 2,483 | 20,720 | 1900..... | 1,792 | 19,305 | 1911..... | 51,102 | 475,865 |
| 1889..... | 2,590 | 24,585 | 1901..... | 2,800 | 20,677 | 1912..... | 81,425 | 763,470 |
| 1890..... | 1,933 | 12,500 | 1902..... | 4,087 | 33,802 | 1913..... | 56,846 | 575,269 |
| 1891..... | 589 | 9,744 | 1903..... | 2,881 | 28,493 | 1914..... | 30,022 | 353,353 |

Prices:—The price of brick varies greatly with the quality, locality, market or demand. The values as given in the table of production are those at the yard or kiln and do not include costs of delivery. They do not, therefore, represent the price to the consumer. The average price of common brick at the kiln in 1914 according to these returns was \$7.99, as compared with \$8.85 in 1913 and \$9.11 in 1912; and of pressed brick \$11.91 in 1914, as compared with \$12.49 in 1913, and \$12.86 in 1912.

In the Maritime Provinces during 1914 the price of common brick varied from \$7.50 to \$11.00, averaging for Nova Scotia \$7.75 and for New Brunswick \$10.61.

In Quebec the price of common brick varied between \$5 and \$8.50, averaging \$7.40 while the price of pressed brick averaged \$15.91. The average price of common brick in Ontario was \$7.86, the limits of variation being \$6.00 and \$10.50; while for pressed brick the average was \$10.77 and the variation from \$10.00 to \$15.00.

In all the western provinces common brick ranged from about \$8.00 to \$11.50, averaging \$10.79 in Manitoba, \$8.98 in Saskatchewan, \$7.92 in Alberta, and \$8.56 in British Columbia. Pressed brick ranged from \$11.00 to \$27.00 in individual yards, averaging \$12.59 in Manitoba, \$17.31 in Saskatchewan, \$13.52 in Alberta, and \$26.50 in British Columbia.

The following table shows the average values at the kilns, of common and pressed brick, during 1912, 1913, and 1914, as furnished by the producers.

Average Prices per Thousand of Common and Pressed Brick.

| | Common brick. | | | Pressed brick. | | |
|-----------------------|---------------|---------|---------|----------------|---------|---------|
| | 1912. | 1913. | 1914. | 1912. | 1913. | 1914. |
| | \$ cts. | \$ cts. | \$ cts. | \$ cts. | \$ cts. | \$ cts. |
| Nova Scotia..... | 6 86 | 7 82 | 7 75 | 16 00 | 16 06 | 15 32 |
| New Brunswick..... | 9 22 | 10 00 | 10 61 | 10 00 | 12 00 | 22 50 |
| Quebec..... | 8 08 | 7 89 | 7 40 | 12 04 | 12 73 | 15 91 |
| Ontario..... | 8 69 | 8 88 | 7 86 | 10 40 | 11 48 | 10 77 |
| Manitoba..... | 11 47 | 11 21 | 10 79 | 15 13 | 17 28 | 12 59 |
| Saskatchewan..... | 9 73 | 9 86 | 8 98 | 16 63 | 16 15 | 17 31 |
| Alberta..... | 10 69 | 9 13 | 7 92 | 14 77 | 12 97 | 13 52 |
| British Columbia..... | 9 61 | 9 49 | 8 56 | 27 53 | 25 65 | 26 50 |
| Canada..... | 9 11 | 8 85 | 7 99 | 12 86 | 12 49 | 11 91 |

According to trade journals, the following retail prices were quoted during the year:—

Toronto:—Grey stock brick were quoted uniformly throughout the year at \$11.50 per M and red stock brick at \$12; Don Valley No. 1 dry pressed and buff brick \$17 at the yard; Port Credit brick, f.o.b. Port Credit, wire cut, \$10 per M, and pressed brick \$12 to \$15 according to grade.

Winnipeg:—Kiln run brick were quoted throughout the year at \$13, sewer and chimney brick at \$14, and veneer brick at \$15. Pressed brick were quoted at from \$25 to \$50.

PRODUCTION OF BRICK BY PROVINCES.

Nova Scotia and New Brunswick:—The total sales in Nova Scotia were 12,672,826 brick, valued at \$99,012, as compared with sales of 22,085,765 brick, valued at \$174,024 in 1913. The chief sources of production were: Annapolis Royal, Pugwash, Elmsdale, Amherst, Orangedale, and New Glasgow.

The total sales in New Brunswick were 6,133,528 brick, valued at \$66,292, as compared with 6,189,152 brick, valued at \$61,969 in 1913; and the principal sources of production were Fredericton, St. John, Chatham, and Lewisville.

Quebec:—The total sales of brick in Quebec in 1914 were 126,818,949, valued at \$1,010,861, comprising 118,278,889 common brick, valued at \$874,961, or \$7.40 per thousand, and 8,540,060 pressed brick, valued at \$135,900, or \$15.91 per thousand.

The sales in 1913 were 153,696,242, valued at \$1,250,765, comprising 145,972,957 common brick, valued at \$1,152,444, or \$7.89 per thousand, and 7,723,285 pressed brick, valued at \$98,321, or \$12.73 per thousand.

While brick-making is carried on at many places in the Province, the principal plants are located at Montreal, Laprairie, Sherbrooke, Quebec, and Deschaillons.

Ontario:—This Province is credited in 1914 with over 57 per cent of the brick production of Canada, the total sales as reported by 282 firms being 322,049,709 brick, valued at \$2,741,120, and including 249,896,642 common brick, valued at \$1,963,921 or an average of \$7.86 per thousand, and 72,153,067 pressed brick, valued at \$777,199 or an average of \$10.77 per thousand.

The total sales in 1913 were 430,029,531 brick, valued at \$4,026,029, and comprised 349,846,487 common brick, valued at \$3,105,256, or an average of \$8.88 per thousand, and 80,183,044 pressed brick, valued at \$920,773, or an average of \$11.48 per thousand.

The city of Toronto and vicinity, including the counties of York, Peel, and Halton, is the principal brick-making section, and in 1914 produced about 63 per cent of the Ontario production, or about 36 per cent of the total Canadian production of brick. The county of Wentworth, comprising the city of Hamilton and vicinity, produced nearly 6 per cent of the Ontario production. The Ottawa district, including the counties of Russell and Carleton, produced about 7 per cent.

The greater part of the pressed brick reported as such was made in Toronto and Hamilton districts.

The production by principal counties in 1914 and 1913 is shown in the accompanying tables.

Sale of Common and Pressed Brick in Ontario by Principal Counties, 1914.

| County. | Common. | | | Pressed. | | | Total value. | Per cent |
|---------------------------|-------------|-----------|---------|------------|---------|---------|--------------|----------|
| | No. | Value. | Per M. | No. | Value. | Per M. | | |
| | | \$ | \$ cts. | | \$ | \$ cts. | \$ | |
| York..... | 100,565,314 | 807,673 | 8 03 | 4,979,600 | 72,192 | 14 50 | 879,865 | 32.10 |
| Peel..... | 39,981,156 | 278,242 | 6 96 | 14,566,450 | 152,435 | 10 47 | 430,677 | 15.71 |
| Halton..... | | | | 40,404,037 | 424,627 | 10 51 | 424,627 | 15.49 |
| Wentworth..... | 18,846,955 | 117,896 | 6 26 | 4,329,240 | 39,059 | 9 02 | 156,955 | 5.73 |
| Carleton..... | 10,027,000 | 95,908 | 9 56 | | | | 95,908 | 3.50 |
| Russell..... | 11,574 | 79,295 | 6 85 | 1,355,079 | 15,702 | 11 59 | 94,997 | 3.47 |
| Thunder Bay District... | 5,049,176 | 46,696 | 9 25 | 2,395,873 | 31,056 | 12 96 | 77,752 | 2.84 |
| Middlesex..... | 6,678,511 | 56,743 | 8 50 | 1,750,000 | 19,800 | 11 31 | 76,543 | 2.79 |
| Kent..... | 6,498,600 | 51,074 | 7 86 | | | | 51,074 | 1.86 |
| Waterloo..... | 5,340,321 | 37,719 | 7 06 | | | | 37,719 | 1.38 |
| Lincoln..... | 2,522,325 | 22,956 | 9 10 | 734,788 | 8,450 | 11 50 | 31,406 | 1.14 |
| Peterboro..... | 3,000,000 | 30,000 | 10 00 | | | | 30,000 | 1.09 |
| Simcoe..... | 3,150,000 | 26,313 | 8 35 | | | | 26,313 | 0.96 |
| Renfrew..... | 2,503,775 | 22,595 | 9 02 | | | | 22,595 | 0.82 |
| Essex..... | 2,688,000 | 18,863 | 7 02 | | | | 18,863 | 0.69 |
| Nipissing..... | 2,050,000 | 18,850 | 9 20 | | | | 18,850 | 0.69 |
| Grey..... | 2,094,283 | 16,748 | 8 00 | | | | 16,748 | 0.61 |
| Total, 17 counties..... | 222,569,416 | 1,727,571 | 7 76 | 70,515,067 | 763,321 | 10 82 | 2,490,892 | 90.87 |
| Total, other counties.... | 27,327,226 | 236,350 | 8 65 | 1,638,000 | 13,878 | 8 47 | 250,228 | 9.13 |
| Total, Ontario..... | 249,896,642 | 1,963,921 | 7 86 | 72,153,067 | 777,199 | 10 77 | 2,741,120 | 100.00 |

Sale of Common and Pressed Brick in Ontario by Principal Counties, 1913.

| County. | Common. | | | Pressed. | | | Total value. | Per cent. |
|-------------------------|-------------|-----------|---------|------------|---------|---------|--------------|-----------|
| | No. | Value. | Per M. | No. | Value. | Per M. | | |
| | | \$ | \$ cts. | | \$ | \$ cts. | \$ | |
| York..... | 155,311,199 | 1,376,191 | 8 86 | 5,641,285 | 84,619 | 15 00 | 1,460,810 | 36.28 |
| Halton..... | | | | 48,703,150 | 553,926 | 11 37 | 553,926 | 13.76 |
| Wentworth..... | 37,414,652 | 320,400 | 8 56 | 12,633,406 | 127,528 | 10 09 | 447,928 | 11.13 |
| Peel..... | 20,206,400 | 163,688 | 8 10 | 9,861,341 | 109,097 | 11 06 | 272,785 | 6.78 |
| Algoma..... | 15,105,673 | 149,058 | 9 87 | 1,294,878 | 21,015 | 16 23 | 170,073 | 4.22 |
| Carleton..... | 13,765,000 | 138,740 | 10 08 | | | | 138,740 | 3.45 |
| Russell..... | 11,653,000 | 80,849 | 6 94 | 848,000 | 10,176 | 12 00 | 91,025 | 2.26 |
| Kent..... | 9,762,500 | 76,943 | 7 88 | | | | 76,943 | 1.91 |
| Grey..... | 8,860,556 | 69,573 | 7 85 | | | | 69,573 | 1.73 |
| Waterloo..... | 7,255,672 | 67,330 | 9 28 | | | | 67,330 | 1.67 |
| Middlesex..... | 6,802,197 | 64,042 | 9 42 | | | | 64,042 | 1.59 |
| Nipissing..... | 6,273,000 | 64,030 | 10 21 | | | | 64,030 | 1.59 |
| Lincoln..... | 4,998,893 | 45,882 | 9 18 | 1,200,984 | 14,412 | 12 00 | 60,294 | 1.50 |
| Simcoe..... | 4,846,000 | 40,600 | 8 38 | | | | 40,600 | 1.01 |
| Renfrew..... | 4,226,000 | 38,134 | 9 02 | | | | 38,134 | 0.95 |
| Essex..... | 4,649,775 | 37,515 | 8 07 | | | | 37,515 | 0.93 |
| Brant..... | 2,993,200 | 35,213 | 11 77 | | | | 35,213 | 0.87 |
| Total, 17 counties..... | 314,123,717 | 2,768,188 | 8 81 | 80,183,044 | 920,773 | 11 48 | 3,688,961 | 91.63 |
| Total, other counties.. | 35,722,770 | 337,068 | 9 44 | | | | 337,068 | 8.37 |
| Total, Ontario..... | 349,846,487 | 3,105,256 | 8 88 | 80,183,044 | 920,773 | 11 48 | 4,026,029 | 100.00 |

The annual production of common and pressed brick as ascertained by the Ontario Bureau of Mines, is shown in the following table. The figures differ only slightly from those reported directly to the Mines Branch.

Building Brick Made in Ontario Since 1898.

| | Common brick. | | | Pressed brick. | | |
|------------|---------------|-----------|----------------|----------------|---------|----------------|
| | M. | Value. | Average per M. | M. | Value. | Average per M. |
| | | \$ | \$ cts. | | \$ | \$ cts. |
| 1898..... | 170,000 | 914,000 | 5-376 | 8,970 | 100,344 | 11-187 |
| 1899..... | 233,898 | 1,313,750 | 5-617 | 10,808 | 105,000 | 9-715 |
| 1900..... | 240,430 | 1,379,590 | 5-738 | 11,562 | 114,419 | 9-896 |
| 1901..... | 259,265 | 1,530,460 | 5-903 | 12,846 | 104,394 | 8-127 |
| 1902..... | 220,500 | 1,411,000 | 6-399 | 19,755 | 144,171 | 7-298 |
| 1903..... | 230,000 | 1,561,700 | 6-790 | 23,703 | 218,550 | 9-220 |
| 1904..... | 200,000 | 1,430,000 | 7-150 | 26,857 | 226,750 | 8-443 |
| 1905..... | 250,000 | 1,937,500 | 7-750 | 26,000 | 234,000 | 9-000 |
| 1906..... | 300,000 | 2,157,000 | 7-190 | 39,860 | 337,795 | 8-475 |
| 1907..... | 273,882 | 2,109,978 | 7-704 | 69,763 | 648,683 | 9-298 |
| 1908..... | 222,361 | 1,575,875 | 7-087 | 56,167 | 485,819 | 8-649 |
| 1909..... | 246,308 | 1,916,147 | 7-779 | 53,167 | 490,571 | 9-227 |
| 1910..... | 304,988 | 2,374,287 | 7-785 | 44,204 | 458,596 | 10-375 |
| 1911..... | 354,546 | 2,801,971 | 7-903 | 52,764 | 564,630 | 10-701 |
| 1912..... | 385,000 | 3,178,250 | 8-255 | 65,598 | 634,169 | 9-667 |
| 1913..... | 408,808 | 3,452,352 | 8-445 | 81,238 | 919,741 | 11-321 |
| 1914*..... | 294,400 | 2,336,207 | 7-935 | 60,620 | 646,604 | 10-67 |

* Preliminary.

In addition to the ordinary clay building brick, there was produced in this Province in 1914, ornamental brick valued at \$15,504, and fireproofing and terra-cotta valued at \$205,204. In 1913 the production of ornamental brick was valued at \$9,810 and of fireproofing and terra-cotta \$150,268.

Manitoba:—Throughout all of the western provinces there was again a large falling off in the demand for brick. In Manitoba the total sales were 29,035,950, valued at \$317,488, comprising 26,777,950 common brick, valued at \$289,060, or an average of \$10.79 per thousand, and 2,258,000 pressed brick, valued at \$28,428, or \$12.59 per thousand. The sales in 1913 were 43,660,320, valued at \$514,358, comprising 39,559,320 common brick, valued at \$443,498, or an average of \$11.21 per thousand, and 4,101,000 pressed brick, valued at \$70,860 or \$17.28 per thousand.

The principal brick-making plants operated were at Winnipeg, St. Boniface, Lac du Bonnet, Portage la Prairie, Sidney, Gilbert Plains, Balmoral, and Neepawa.

Saskatchewan:—The total sales of clay building brick in Saskatchewan in 1914 were 8,715,000 valued at \$93,699 which includes 6,865,000 common brick, valued at \$61,669 or an average of \$8.98 per thousand, and 1,850,000 pressed brick, valued at \$32,030 or an average of \$17.31 per thousand. The total sales in 1913 were 18,175,000, valued at \$189,820, which included 16,475,000 common brick, valued at \$162,370, or an average of \$9.86 per thousand, and 1,700,000 pressed brick, valued at \$27,450, or an average of

\$16.15 per thousand. The falling off in sales was over 50 per cent and stocks on hand at the end of the year were almost equal to the year's sales.

The principal clay plants are located at Estevan, Prince Albert, Bruno, Weyburn, Saskatoon, Rosthern, Verigin, and Broadview.

Alberta:—The total sales of clay building brick in 1914 were 30,169,757, valued at \$278,054, comprising 23,190,257 common brick, valued at \$183,696 or an average of \$7.92 per thousand, and 6,979,500 pressed brick, valued at \$94,358 or an average of \$13.52 per thousand.

The total sales in 1913 were 71,996,343 brick, valued at \$732,408, comprising 52,378,283 common brick, valued at \$477,998 or an average of \$9.13 per thousand, and 19,618,060 pressed brick, valued at \$254,410 or an average of \$12.97 per thousand. The decrease in the value of sales in 1914 was over 58 per cent, and stocks on hand at the end of the year were equivalent to nearly 65 per cent of the year's sales.

The principal centres of production are: Edmonton, Cochrane, Calgary, Medicine Hat, Redcliff, Lethbridge, Red Deer, Sandstone, Brickburn, and Innisfail.

There was also a production during 1914 of ornamental brick, valued at \$3,264, and fireproofing and terra-cotta, valued at \$96,025, as compared with ornamental brick valued at \$738, and fireproofing, etc., valued at \$146,200 in 1913.

British Columbia:—The total sales of brick in this Province in 1914 were reported as 15,552,901, valued at \$162,891 which included 13,896,950 common brick, valued at \$119,002 or an average of \$8.56 per thousand, and 1,655,951 pressed brick, valued at \$43,889 or an average of \$26.50 per thousand.

The total sales in 1913 were 39,396,375, valued at \$426,733 which included 36,131,903 common brick, valued at \$343,020 or an average of \$9.49 per thousand, and 3,264,472 pressed brick, valued at \$83,713 or an average of \$25.65 per thousand. The decrease in the value of the sales in 1914 was over 61 per cent and the stocks on hand at the end of the year amounted to more than 60 per cent of the year's sales.

In addition to the building brick there was also a production of fireproofing brick valued at \$58,077, as against a value of \$42,919 in 1913.

The principal centres of manufacture are: Vancouver, New Westminster, Clayburn, Port Haney and vicinity, Gabriola Island, Victoria, Sydney and Kelowna.

CLAY PAVING BRICK.

The total production of paving brick and paving blocks in Canada in 1914 was reported as 2,707,000, valued at \$49,627, or an average value per thousand of \$18.33, as compared with a production of 4,208,295, valued at \$75,669, or an average value of \$17.98 per thousand in 1913.

This paving brick is made chiefly at West Toronto, Ontario, from shale obtained from the banks of the Humber river, although during the past two years there has also been a small production reported from Edmonton, Alberta, and Clayburn, British Columbia.

The annual production has for a number of years varied from 3,000,000 to over 5,000,000 per season, and the Ontario output finds a market chiefly in Toronto.

Statistics of production since 1887 are shown in the next table.

The imports of paving brick during the past five years have considerably exceeded the domestic production. During the calendar year 1914 the imports were 9,069,000, valued at \$145,063 or an average value per thousand of \$16.00, and included 6,395,000, valued at \$103,900 or an average of \$16.25 from the United States, and 2,674,000, valued at \$41,163 or an average of \$15.21 from Great Britain. The total imports during the calendar year 1913 were 13,035,000, valued at \$176,497, or an average value per thousand of \$13.54, and included 7,779,000, valued at \$103,572, or an average of \$13.31 from the United States, and 5,256,000 valued at \$72,925 or an average of \$13.87 from Great Britain.

Annual Production of Paving Brick*.

| Year. | M. | Value. | Average per M. | Year. | M. | Value. | Average per M. |
|-----------|-------|--------|----------------|-----------|-------|--------|----------------|
| | | \$ | \$ cts. | | | \$ | \$ cts. |
| 1897..... | 4,568 | 45,670 | 10 00 | 1906..... | 3,000 | 45,000 | 15 00 |
| 1898..... | | | | 1907..... | 3,618 | 72,354 | 20 00 |
| 1899..... | 5,300 | 42,550 | 8 03 | 1908..... | 3,720 | 59,456 | 15 98 |
| 1900..... | 2,710 | 26,950 | 9 94 | 1909..... | 3,760 | 67,408 | 17 93 |
| 1901..... | 3,689 | 37,000 | 10 03 | 1910..... | 4,215 | 78,980 | 18 74 |
| 1902..... | 4,211 | 42,000 | 9 97 | 1911..... | 5,220 | 79,444 | 15 22 |
| 1903..... | 3,789 | 45,288 | 11 95 | 1912..... | 4,580 | 85,989 | 18 78 |
| 1904..... | 4,436 | 55,450 | 12 50 | 1913..... | 4,208 | 75,669 | 17 98 |
| 1905..... | 4,500 | 54,000 | 12 00 | 1914..... | 2,707 | 49,627 | 18 33 |

* Figures previous to 1907 compiled from Ontario Bureau of Mines.

Imports of Paving Brick.*

| Year. | M. | Value. | Average per M. | Year. | M. | Value. | Average per M. |
|--------------|-------|--------|----------------|--------------------|---------|---------|----------------|
| Fiscal Year. | | \$ | \$ cts. | Fiscal Year. | | \$ | \$ cts. |
| 1895..... | 275 | 5,006 | 18 20 | 1906..... | 4,104 | 46,008 | 11 21 |
| 1896..... | 918 | 10,132 | 11 04 | 1907 (9 mos.)..... | 2,182 | 23,256 | 10 66 |
| 1897..... | 52 | 719 | 13 83 | 1908..... | 5,340 | 61,346 | 11 49 |
| 1898..... | 367 | 2,337 | 6 37 | 1909..... | 101,187 | | † |
| 1899..... | 1,583 | 23,648 | 14 94 | Calendar Year. | | | |
| 1900..... | 2,175 | 35,644 | 16 39 | 1910..... | 10,503 | 124,994 | 11 90 |
| 1901..... | 900 | 10,414 | 11 57 | 1911..... | 11,450 | 164,292 | 14 34 |
| 1902..... | 1,030 | 16,788 | 16 30 | 1912..... | 11,793 | 160,663 | 13 62 |
| 1903..... | 1,337 | 18,811 | 14 07 | 1913..... | 13,035 | 176,497 | 13 54 |
| 1904..... | 1,986 | 29,753 | 14 98 | 1914..... | 9,069 | 145,063 | 16 00 |
| 1905..... | 3,350 | 32,578 | 13 86 | | | | |

*Duty 20 per cent.

† The imports during July, 1908, under the general tariff, are reported as 6,581 M, value \$7,317, an apparent error. There appears also to be an error in the entries for August and September of the same year, and the total number has, therefore, been omitted. The actual value of the imported brick varies from \$10 to \$12 per M.

FIRECLAY AND FIRECLAY PRODUCTS.

There are a number of clays from different localities in Canada that have been used in the manufacture of refractory brick or firebrick, and for furnace linings, etc., which have been usually termed "fireclays". These include clays found with the coal measures at Westville, Nova Scotia, and at Comox, Vancouver island, also clays found south of Moosejaw, Sask., at Clayburn, near the city of Vancouver, B.C., and at Kilgard, B.C. Stove linings and other refractory clay products are made at several places in Ontario and Quebec from imported clays.

The total value of the sales of fireclays, firebrick, and fireclay products in 1914 was \$107,568, as compared with a valuation of \$142,738 in 1913, and \$125,585 in 1912. There was in addition, in 1914, a production of fireclay products valued at \$30,264 reported as being made from imported clays.

The production in 1914 included fireclay or refractory clay, sold as such to the extent of 2,171 tons valued at \$12,875; firebrick 2,815,690, valued at \$72,299, or an average of \$25.67 per thousand; and other fireclay products valued at \$22,394.

The production in 1913 included fireclay or refractory clay sold as such to the extent of 3,345 tons valued at \$14,018; firebrick 3,667,276, valued at \$86,164 or an average of \$23.50 per thousand; and other fireclay products valued at \$42,556.

The imports of firebrick during the calendar year 1914 were valued at \$690,133 of which \$592,650 was from the United States, \$93,837 from Great Britain, and \$3,646 from other countries.

The imports of firebrick during the calendar year 1913 were valued at \$1,192,857 of which \$952,667 were imported from the United States, \$230,500 from Great Britain, and \$9,690 from other countries.

Fireclay was imported, during the calendar year 1914, to the value of \$90,233 as compared with a value of \$143,399 in 1913, and \$140,500 in 1912.

Statistics of the annual production since 1907 of firebrick, refractory clay or fireclay, sold as such, and of fireclay products; and statistics of the imports of firebrick and fireclay are shown in the following tables:—

Production of Fireclay and Fireclay Products.

| Year. | Firebrick. | | | Fireclay. | | | Other fireclay products. | Total value. |
|-----------|------------|---------|---------|-----------|--------|-------------|--------------------------------|-----------------|
| | No. sold. | Value. | Per M. | Tons. | Value. | Per Ton. | Value. | |
| | | \$ | \$ cts. | | \$ | \$ cts. | \$ | \$ |
| 1907..... | 4,323,179 | 113,322 | 26 21 | ..... | ..... | ..... | 18,000 | 131,322 |
| 1908..... | 2,415,871 | 70,429 | 29 16 | 1,984 | 8,121 | 4 09 | 31,752 | 110,302 |
| 1909..... | 1,059,270 | 32,742 | 30 92 | 4,405 | 12,390 | 2 81 | 33,000 | 78,132 |
| 1910..... | 1,375,400 | 21,352 | 21 34 | 1,425 | 5,863 | 4 11 | 15,000 | 50,215 |
| 1911..... | 2,367,937 | 44,122 | 18 63 | 7,532 | 24,128 | 3 20 | 20,880 | 89,130 |
| 1912..... | 3,429,594 | 67,192 | 19 59 | 6,307 | 24,343 | 3 86 | 34,050 | 125,585 |
| 1913..... | 3,667,276 | 86,164 | 23 50 | 3,345 | 14,018 | 4 19 | 42,556 | 142,738 |
| 1914..... | 2,815,690 | 72,299 | 25 67 | 2,171 | 12,875 | 5 93 | 22,394 | 107,568 |

Imports of Firebrick and Fireclay.

| Fiscal Year. | Fireclay. | Firebrick. | Fiscal Year. | Fireclay. | Firebrick. |
|--------------|-----------|------------|----------------|-----------|------------|
| | \$ | \$ | | \$ | \$ |
| 1900..... | 59,291 | 39,535 | 1908..... | 155,873 | 639,347 |
| 1901..... | 79,530 | 32,831 | 1909..... | 77,146 | 350,457 |
| 1902..... | 64,541 | 45,608 | Calendar Year. | | |
| 1903..... | 94,509 | 34,522 | 1910..... | 124,293 | 811,927 |
| 1904..... | 52,716 | 38,335 | 1911..... | 125,199 | 814,414 |
| 1905..... | 73,837 | 44,746 | 1912..... | 140,500 | 953,621 |
| 1906..... | 131,130 | 51,892 | 1913..... | 143,399 | 1,192,857 |
| 1907*..... | 85,044 | 349,185 | 1914..... | 90,233 | 690,133 |

* 9 months ending March.

SEWERPIPE AND DRAIN TILE.

The total value of the sales of sewerpipe in 1914 was \$1,104,499 as compared with a value of \$1,035,906 in 1913 and \$884,641 in 1912. About 54 per cent of the production in 1914 was made in Ontario.

Following is a list of firms reporting production of sewerpipe in 1913:—

Standard Clay Products, Limited, St. Johns, Que., and New Glasgow, N. S.

Ontario Sewerpipe Company, Mimico, Ont.

Dominion Sewerpipe Company, Swansea, Ont.

Hamilton & Toronto Sewerpipe Company, Hamilton, Ont.

Alberta Clay Products Company, Medicine Hat, Alberta.

Kilgard Fireclay Company, Kilgard, B.C.

The Clayburn Company, Limited, Clayburn, B.C.

British Columbia Pottery Company, Victoria, B.C.

The imports of drain pipe and sewerpipe during 1914 were valued at \$338,533 of which \$305,546 were imported from the United States; \$32,866 from Great Britain; and \$121 from other countries. The total imports during 1913 were valued at \$465,997 of which \$396,641 were imported from the United States, and \$69,356 from Great Britain.

The total sales of drain tile in Canada in 1914 as reported to this Branch were valued at \$366,340, as compared with sales of \$338,552 in 1913 and \$357,862 in 1912. The greater part of this production is in the Province of Ontario; the sales in this Province in 1914 as reported to this Branch were 18,592,254, valued at \$343,662, as against a value of \$314,859 in 1913, and \$308,050 in 1912.

The Ontario Bureau of Mines reports the total number of drain tile made in that Province during 1914 as 14,710,000, valued at \$277,530 or an average of \$18.87 per thousand, as compared with 16,935,000, valued at \$292,767 or an average of \$17.28 per thousand in 1913.

The imports of unglazed tile are comparatively small, the value during the calendar year 1914 being \$2,941, as compared with \$12,156 in 1913 and \$4,018 in 1912.

Statistics of the annual production of sewerpipe and of the imports of drain tile and sewerpipe, are shown in the next three tables:—

Production of Sewerpipe.

| Calendar Year. | Value. | Calendar Year. | Value. | Calendar Year. | Value. |
|----------------|---------------|----------------|---------|----------------|-----------|
| | \$ | | \$ | | \$ |
| 1888..... | 266,320 | 1897..... | 164,250 | 1906..... | 350,045 |
| 1889..... | Not available | 1898..... | 181,717 | 1907..... | 667,100 |
| 1890..... | 348,000 | 1899..... | 161,546 | 1908..... | 514,362 |
| 1891..... | 227,300 | 1900..... | 231,525 | 1909..... | 645,722 |
| 1892..... | 367,660 | 1901..... | 248,115 | 1910..... | 774,110 |
| 1893..... | 350,000 | 1902..... | 301,965 | 1911..... | 812,716 |
| 1894..... | 250,325 | 1903..... | 317,970 | 1912..... | 884,641 |
| 1895..... | 257,045 | 1904..... | 440,894 | 1913..... | 1,035,906 |
| 1896..... | 153,875 | 1905..... | 382,000 | 1914..... | 1,104,499 |

Production of Drain Tile in Ontario.

(As ascertained by the Ontario Bureau of Mines.)

| Year. | No. | Value. | Year. | No. | Value. | Year. | No. | Value. |
|-----------|------------|---------|------------|------------|---------|------------|------------|---------|
| | | \$ | | | \$ | | | \$ |
| 1891..... | 7,500,000 | 90,000 | 1899... | 21,027,400 | 240,246 | 1907 .. | 15,578,000 | 250,122 |
| 1892..... | 10,000,000 | 100,000 | 1900... .. | 19,544,000 | 209,738 | 1908... .. | 24,809,000 | 338,658 |
| 1893..... | 17,300,000 | 190,000 | 1901... .. | 21,592,000 | 231,374 | 1909... .. | 27,418,000 | 363,350 |
| 1894..... | 25,000,000 | 280,000 | 1902... .. | 17,510,000 | 199,000 | 1910... .. | 21,028,000 | 318,456 |
| 1895..... | 14,330,000 | 157,000 | 1903... .. | 18,200,000 | 227,000 | 1911... .. | 21,630,000 | 349,545 |
| 1896..... | 13,200,000 | 144,000 | 1904... .. | 16,000,000 | 210,000 | 1912... .. | 16,463,000 | 279,579 |
| 1897..... | * | * | 1905... .. | 15,000,000 | 220,000 | 1913... .. | 16,935,000 | 292,767 |
| 1898..... | 22,668,000 | 225,000 | 1906... .. | 17,700,000 | 252,500 | 1914... .. | 14,710,000 | 277,530 |

* Not stated.

Imports of Drain Tile and Sewerpipe.

| Fiscal Year. | Drain tile (a). | Sewerpipe (b). | Fiscal Year. | Drain tile (a). | Sewerpipe (b). |
|--------------|--------------------|-------------------|--------------------|--------------------|-------------------|
| | \$ | \$ | | \$ | \$ |
| 1880..... | | 33,796 | 1898..... | 157 | 29,454 |
| 1881..... | | 37,368 | 1899..... | 1,817 | 32,071 |
| 1882..... | | 70,061 | 1900..... | 1,383 | 37,766 |
| 1883..... | | 70,699 | 1901..... | 1,264 | 54,819 |
| 1884..... | 5,585 | 66,170 | 1902..... | 269 | 55,261 |
| 1885..... | 2,911 | 66,678 | 1903..... | 252 | 57,100 |
| 1886..... | 1,905 | 56,048 | 1904..... | 1,637 | 53,988 |
| 1887..... | 2,183 | 69,020 | 1905..... | 1,229 | 101,166 |
| 1888..... | 4,290 | 96,967 | 1906..... | 4,727 | 131,353 |
| 1889..... | 2,346 | 80,869 | 1907 (9 mos.)..... | 12,106 | 93,458 |
| 1890..... | 3,780 | 73,654 | 1908..... | 2,080 | 125,747 |
| 1891..... | 673 | 86,522 | 1909..... | 2,394 | 106,399 |
| 1892..... | 473 | 59,064 | Calendar Year. | | |
| 1893..... | 110 | 38,891 | 1910..... | 4,485 | 175,599 |
| 1894..... | 53 | 24,572 | 1911..... | 5,640 | 382,929 |
| 1895..... | 695 | 20,358 | 1912..... | 4,018 | 507,024 |
| 1896..... | 339 | 18,957 | 1913..... | 12,156 | 465,997 |
| 1897..... | 416 | 33,870 | 1914..... | 2,941 | 338,533 |

(a) Drain tile, not glazed.

(b) Drain pipes, sewer pipes, and earthenware fittings therefor, chimney linings, or vents, chimney tops and inverted blocks, glazed or unglazed.

POTTERY AND EARTHENWARE.

The pottery made from Canadian clays has been, hitherto, chiefly of the common grades, such as flowerpots, jardinières, crocks, jars, churns, etc. A number of potters made a higher grade product of stoneware, but the majority of these use imported clays. Sanitaryware is made at St. Johns, Que., and other points; but the raw material, including clays and feldspar, is nearly all imported.

The total value of the production of pottery and clay sanitaryware in 1914, according to returns received, was \$312,846 of which it is estimated that the value of \$277,475 is attributable to imported clays. The total value of the production in 1913 was \$368,916 of which a value of \$315,383 was credited to imported clays.

Annual statistics of production are shown herewith:—

Annual Production of Pottery.

| Calendar Year. | Value. | Calendar Year. | Value. | Calendar Year. | Value. |
|----------------|----------------|----------------|---------|----------------|---------|
| | \$ | | \$ | | \$ |
| 1888..... | 27,750 | 1897..... | 129,629 | 1906..... | 150,000 |
| 1889..... | Not available. | 1898..... | 214,675 | 1907..... | 253,809 |
| 1890..... | 195,242 | 1899..... | 185,000 | 1908..... | 200,541 |
| 1891..... | 258,844 | 1900..... | 200,000 | 1909..... | 285,285 |
| 1892..... | 265,811 | 1901..... | 200,000 | 1910..... | 250,924 |
| 1893..... | 213,186 | 1902..... | 200,000 | 1911..... | 102,493 |
| 1894..... | 162,144 | 1903..... | 200,000 | 1912..... | 43,955 |
| 1895..... | 151,588 | 1904..... | 140,000 | 1913..... | 53,533 |
| 1896..... | 163,427 | 1905..... | 120,000 | 1914..... | 35,371 |

Details of the imports of earthenware and chinaware, showing the values imported and the countries of origin, have already been shown in the general table of imports.

The imports in 1914 were valued at \$2,192,222, as compared with a value of \$3,314,870 in 1913, and \$3,094,956 in 1912. These imports are subdivided into eight classes, and in 1914 included: brown or coloured earthenware, etc., \$71,083; C. C. or cream-coloured ware, decorated, printed, sponged, etc., \$163,431; demijohns, churns or crocks \$25,935; tableware of china, porcelain, white granite, etc., \$1,437,175; china and porcelain ware, n.o.p., \$30,006; tiles or blocks of earthenware or stone prepared for mosaic flooring, \$104,285; earthenware tiles, n.o.p., \$186,161; manufactures of earthenware, n.o.p., \$174,146.

The imports of 1913 comprised: brown or coloured earthenware, etc., \$70,632; C. C. or cream-coloured ware, decorated, printed, or sponged, etc., \$264,090; demijohns, churns or crocks, \$32,599; tableware of china, porcelain, white granite, etc., \$2,185,601; china and porcelain ware, n.o.p., \$43,696; tiles or blocks of earthenware or stone prepared for mosaic flooring, \$173,445; earthenware tiles, n.o.p., \$296,791; manufactures of earthenware, n.o.p., \$248,016.

It will be observed that there has been a general decrease in almost all classes of earthenware and chinaware imported in 1914. Great Britain is the principal source of the imports of this class of products, but quite large supplies are also obtained from the United States, Germany, France, Austria-Hungary, Japan, Belgium, and other countries.

Imports of Earthenware and Chinaware.

| Fiscal Year. | Value. | Fiscal Year. | Value. | Fiscal Year. | Value. |
|--------------|---------|--------------|-----------|--------------------|-----------|
| | \$ | | \$ | | \$ |
| 1880..... | 322,333 | 1892..... | 748,810 | 1904..... | 1,611,356 |
| 1881..... | 439,029 | 1893..... | 709,737 | 1905..... | 1,636,214 |
| 1882..... | 646,734 | 1894..... | 695,514 | 1906..... | 1,692,359 |
| 1883..... | 657,886 | 1895..... | 547,935 | 1907 (9 mos.)..... | 1,422,880 |
| 1884..... | 544,586 | 1896..... | 575,493 | 1908..... | 2,190,784 |
| 1885..... | 511,853 | 1897..... | 595,822 | 1909..... | 1,716,887 |
| 1886..... | 599,269 | 1898..... | 675,874 | Calendar Year. | |
| 1887..... | 750,691 | 1899..... | 916,727 | 1910..... | 2,283,116 |
| 1888..... | 697,082 | 1900..... | 959,526 | 1911..... | 2,516,536 |
| 1889..... | 697,949 | 1901..... | 1,114,677 | 1912..... | 3,094,956 |
| 1890..... | 695,206 | 1902..... | 1,275,093 | 1913..... | 3,314,870 |
| 1891..... | 634,907 | 1903..... | 1,406,610 | 1914..... | 2,192,222 |

KAOLIN.

About 1,000 tons of kaolin valued at \$10,000 were shipped in 1914, as compared with 500 tons valued at \$5,000 in 1913, and 20 tons valued at \$160 in 1912. The production was obtained from the deposits in the township of Amherst, Ottawa county, Quebec, which have been opened up by the Canadian China Clay Company of Montreal.

The plant for refining the clay is situated 2 miles from St. Remi d'Amherst, and 7 miles from Huberdeau, the terminus of the Montefort Branch of the Canadian Northern Quebec railway—94 miles northwest of Montreal.

The imports of china-clay ground and unground, into Canada during the twelve months ending December 1914, were 20,437 tons, valued at \$150,881, or \$7.38 per ton, as against imports of 21,164 tons, valued at \$149,337 or \$7.06 per ton in 1913, and 18,332 tons valued at \$127,402 or \$6.95 per ton in 1912. These figures indicate to some extent at least the present actual demand for this product.

The imports of earthenware and chinaware were, however, valued at \$2,192,222 in 1914, and were comprised chiefly of tableware of china, porcelain, etc., showing the possibilities for the development of industries utilizing china-clays.

Kaolin or china-clay is also in considerable demand in the United States, the imports into that country in 1914 being 288,858 gross tons, valued at \$1,908,407, and in 1913, 240,120 gross tons, valued at \$1,625,451.

The St. Remi d'Amherst kaolin deposits have been described by Mr. Keele in Geological Survey Memoir No. 64¹ from which the following extracts have been taken:—

The crude material, therefore, is a mixture of fine-grained white clay and angular fragments of quartz, mostly under one-fourth of an inch in size. A small quantity of tourmaline is also present. In some parts of the vein the material is almost free from quartz, but for the most part quartz forms over 50 per cent of the deposit.

The lumps of crude kaolin coming from the mine are broken up in a blunger, an iron tank filled with water, in which a vertical shaft, furnished with horizontal arms, revolves. The quartz settles to the bottom of the tank, while the clay is carried off through an overflow pipe and led into a series of troughs, where the finest particles of sand are deposited. After flowing slowly through the troughs, the clay-water finally falls into settling tanks. The clay gradually sinks to the bottom of the tanks and the clear liquid is pumped out. By means of this washing process the deposits yield from 30 to 40 per cent of fine-grained clay. A chemical analysis made from a sample of the washed clay by G. E. F. Lundell, gave the following results:—

| | |
|-----------------------|-------|
| Silica..... | 46.13 |
| Alumina..... | 39.45 |
| Iron oxide..... | 0.72 |
| Lime | None. |
| Magnesia..... | None. |
| Potash..... | 0.20 |
| Soda..... | 0.09 |
| Loss on ignition..... | 13.81 |

100.40

¹ Preliminary Report on the Clay and Shale Deposits of the Province of Quebec, by J. Keele, Memoir 64, Geological Survey, Dept. of Mines, 1915, p. 2.

The analysis shows the material to be of high purity. The physical tests are as follows. The washed kaolin requires 45 per cent of water for tempering. It has a fair amount of plasticity, but like all kaolin, it works rather short and crumbly. The shrinkage on drying is 7 per cent.

| Cone. | Fire shrinkage. % | Absorption. % |
|-------|----------------------|------------------|
| 010 | 3.0 | 34.3 |
| 06 | 3.6 | 34.3 |
| 1 | 4.5 | 32.0 |
| 5 | 9.3 | 20.0 |
| 9 | 11.3 | 17.0 |
| 34 | Softens. | |

This material has greater plasticity and higher shrinkages than most of the standard brands of washed kaolin or china-clay. The samples for testing were taken from near the surface, but at deeper levels, it is possible that the kaolin will not be so plastic and not shrink so much on drying and burning.

The Canadian China Clay Company which operates this mine is disposing of the washed product in Montreal, where it is used as a paper filler. On account of its fineness of grain and pure white colour, it is very suitable for this purpose.

Washed kaolin is one of the ingredients used in all whiteware pottery bodies, such as tableware, china, porcelain, wall tile, sanitary pottery, electrical porcelain, etc. Potters generally call it china-clay. It is the most valuable of all the clays.

PROSPECTING FOR KAOLIN.

Considerable prospecting has been done for kaolin in the vicinity of St. Remi, but so far no other workable deposit has been uncovered.

The whole country has been heavily glaciated, and much of the residual clays which may have existed in pre-glacial time have been removed by erosion. A sheet of glacial drift materials, principally boulder clay, covers the slopes of the hills and the valley bottoms. The kaolin was first discovered by a farmer when sinking a well. He went through 15 feet of boulder clay, and found the white clay deposit beneath. There are probably other deposits in the region, as the Grenville rocks occur at intervals as far west as the Ottawa river and beyond. The general prevalence of the drift covering renders prospecting a tedious and difficult operation, and kaolin being a soft deposit, is never exposed to the surface, unless a stream has cut down to it through the overburden.

LIME.

The lime industry in common with other materials of construction was affected by the financial depression during the latter part of the year 1913 and throughout 1914, and a falling off in production is shown. According to returns received from the producers, the total production in 1914 was 7,028,582 bushels, this being the amount sold or used (equivalent to about 246,000 tons) valued at \$1,360,628, or an average of 19 cents per bushel, or about \$5.53 per ton.

The production in 1913 was reported as 7,558,484 bushels, (264,547 tons) valued at \$1,609,398, or an average of 21 cents per bushel, or \$6.08 per ton. The decrease in production in 1914 was therefore 529,902 bushels, or slightly over 7 per cent.

Returns were received from 85 active firms in 1914, as compared with 77 firms in 1913. The average number of men employed in 1914 was 1,015, and wages paid \$518,331, as against 1,076 men employed and \$577,841 paid in wages in 1913. Statistics in respect to labour and wages in lime production, however, should be used with some discrimination, as many firms producing lime are also engaged in the quarrying of stone for purposes other than lime-burning, and are unable to make separate reports as to labour employed. This is particularly evident in the record from Nova Scotia and New Brunswick, since, for the first mentioned, the record includes only the labour employed at the kilns, while, for the latter, quarry costs are also included.

The average price per bushel of lime sold in 1914 varied from a minimum of $16\frac{1}{2}$ cents in Ontario, to a maximum of 37 cents in British Columbia. In 1913, the range was from a minimum of 18 cents in Ontario to a maximum of 32 cents in British Columbia.

Production of hydrated lime was reported by four firms, viz: The Standard Lime Co. Ltd., Joliette, Que., The Standard White Lime Co. of Guelph, Ont., The Contractors Supply Co. Ltd., Orangeville, Ont., and the Guelph Ontario Reformatory.

Lime Production by Provinces, 1914.

| Province. | No. of active firms reporting. | Men employed. | Wages paid. | SALES. | | | |
|----------------------|---|------------------|----------------|-----------|-----------|---------------------------|---------------------------------|
| | | | | Bushels. | Value. | Average per bushel. | Per cent. of total value. |
| | | | \$ | | \$ | cts. | % |
| P. E. Island..... | 1 | 2 | 61 | 1,693 | 542 | 32 | 0.04 |
| Nova Scotia..... | 1 | 15 | 6,900 | 516,029 | 103,206 | 20 | 7.59 |
| New Brunswick..... | 5 | 89 | 47,224 | 391,739 | 102,980 | 26.3 | 7.57 |
| Quebec..... | 18 | 258 | 137,640 | 1,767,935 | 389,064 | 22 | 28.59 |
| Ontario..... | 43 | 429 | 224,937 | 3,393,078 | 556,850 | 16.4 | 40.92 |
| Manitoba..... | 7 | 123 | 47,331 | 526,167 | 92,898 | 17.7 | 6.83 |
| Alberta..... | 6 | 58 | 25,963 | 280,252 | 58,321 | 20.8 | 4.29 |
| British Columbia.... | 4 | 41 | 28,275 | 151,689 | 56,767 | 37.4 | 4.17 |
| Total..... | 85 | 1,015 | 518,331 | 7,028,582 | 1,360,628 | 19.3 | 100.00 |

Lime Production by Provinces, 1913.

| Province. | No. of active firms reporting. | Men employed. | Wages paid. | SALES. | | | |
|----------------------|---|------------------|----------------|-----------|-----------|---------------------------|---------------------------------|
| | | | | Bushels. | Value. | Average per bushel. | Per cent. of total value. |
| | | | \$ | | \$ | cts. | % |
| P. E. Island..... | 1 | 2 | 130 | 3,762 | 1,129 | 30 | 10.65 |
| Nova Scotia..... | 1 | 10 | 5,199 | 851,050 | 170,210 | 20 | |
| New Brunswick..... | 5 | 93 | 50,180 | 392,985 | 98,841 | 25 | 6.14 |
| Quebec..... | 17 | 321 | 162,422 | 1,616,446 | 418,008 | 26 | 25.97 |
| Ontario..... | 39 | 410 | 239,143 | 3,254,482 | 573,209 | 18 | 35.62 |
| Manitoba..... | 5 | 42 | 21,640 | 576,938 | 107,281 | 19 | 6.66 |
| Saskatchewan..... | 1 | 8 | 3,000 | 35,000 | 10,000 | 29 | 0.62 |
| Alberta..... | 6 | 70 | 50,127 | 465,250 | 115,355 | 25 | 7.17 |
| British Columbia.... | 2 | 120 | 46,000 | 362,571 | 115,365 | 32 | 7.17 |
| Total..... | 77 | 1,076 | 577,841 | 7,558,484 | 1,609,398 | 21 | 100.00 |

Lime Production by Provinces, 1912.

| Province. | No. of active firms reporting. | Men employed. | Wages paid. | SALES. | | | |
|----------------------|---|------------------|----------------|-----------|-----------|---------------------------|---------------------------------|
| | | | | Bushels. | Value. | Average per bushel. | Per cent. of total value. |
| | | | \$ | | \$ | cts. | % |
| P. E. Island..... | 4 | 10 | 844 | 24,971 | 8,191 | 33 | 0.44 |
| Nova Scotia..... | 1 | 8 | 5,510 | 684,625 | 136,930 | 20 | 7.42 |
| New Brunswick..... | 5 | 96 | 53,536 | 616,835 | 133,742 | 22 | 7.25 |
| Quebec..... | 21 | 334 | 157,909 | 1,729,614 | 474,595 | 27 | 25.73 |
| Ontario..... | 32 | 470 | 242,196 | 3,376,193 | 573,269 | 17 | 31.07 |
| Manitoba..... | 5 | 10 | 2,656 | 818,237 | 168,257 | 21 | 9.12 |
| Saskatchewan..... | 1 | 6 | 450 | 4,000 | 1,440 | 36 | 0.08 |
| Alberta..... | 4 | 76 | 52,272 | 704,035 | 166,520 | 24 | 9.03 |
| British Columbia.... | 5 | 93 | 60,844 | 517,329 | 181,905 | 35 | 9.86 |
| Total..... | 78 | 1,103 | 576,217 | 8,475,839 | 1,844,849 | 22 | 100.00 |

Lime Production by Provinces, 1910 and 1911.

| Province. | 1910. | | | | 1911. | | | |
|-----------------------|-----------|-----------|---------------------|--------------------------|-----------|-----------|---------------------|--------------------------|
| | Bushels. | Value. | Average per bushel. | Per cent of total value. | Bushels. | Value. | Average per bushel. | Per cent of total value. |
| | | \$ | cts. | % | | \$ | cts. | % |
| Nova Scotia..... | 55,750 | 13,490 | 24 | 1.2 | 639,200 | 130,555 | 53 | 8.60 |
| New Brunswick..... | 470,050 | 105,593 | 22 | 9.3 | 613,728 | 132,897 | 22 | 8.76 |
| Quebec..... | 1,227,555 | 299,126 | 23 | 26.3 | 1,428,392 | 356,453 | 25 | 23.49 |
| Ontario..... | 2,988,020 | 476,137 | 16 | 41.9 | 3,360,265 | 538,902 | 16 | 35.51 |
| Manitoba..... | 606,679 | 100,808 | 17 | 8.8 | 706,888 | 140,629 | 20 | 9.27 |
| Alberta..... | 303,214 | 69,268 | 23 | 6.1 | 434,038 | 100,407 | 23 | 6.61 |
| British Columbia..... | 196,878 | 72,657 | 37 | 6.4 | 351,014 | 117,756 | 34 | 7.76 |
| | 5,848,146 | 1,137,079 | 19 | 100.0 | 7,533,525 | 1,517,599 | 20 | 100.00 |

Exports and Imports:—The value of the lime exported during the calendar year 1914 was \$16,927, the destination being mainly the United States. In 1913, the exports were valued at \$29,234. The imports of lime during the calendar year 1914, were 340,828 barrels, (34,083 tons) valued at \$211,123, or an average of 62 cents per barrel, or \$6.16 per ton, and were derived chiefly from the United States. The imports during 1913 were 386,693 barrels (38,669 tons) valued at \$238,271 or an average of 62 cents per barrel, or \$6.16 per ton.

Annual statistics of exports and imports are given in the next two tables:—

Exports of Lime.

| Calendar Year. | Value. | Calendar Year. | Value. | Calendar Year. | Value. |
|----------------|---------|----------------|---------|----------------|--------|
| | \$ | | \$ | | \$ |
| 1891..... | 119,853 | 1899..... | 73,565 | 1907..... | 55,903 |
| 1892..... | 121,535 | 1900..... | 80,852 | 1908..... | 43,316 |
| 1893..... | 86,623 | 1901..... | 99,194 | 1909..... | 48,821 |
| 1894..... | 83,670 | 1902..... | 116,009 | 1910..... | 44,762 |
| 1895..... | 71,697 | 1903..... | 131,412 | 1911..... | 39,536 |
| 1896..... | 70,820 | 1904..... | 73,838 | 1912..... | 35,097 |
| 1897..... | 53,177 | 1905..... | 85,723 | 1913..... | 29,234 |
| 1898..... | 49,594 | 1906..... | 57,072 | 1914..... | 16,927 |

Imports of Lime.

| Year. | Barrels. | Value. | Average value. | Year. | Barrels. | Value. | Average value. |
|--------------|----------|--------|----------------|--------------------|----------|---------|----------------|
| Fiscal Year. | | \$ | \$ cts. | Fiscal Year. | | \$ | \$ cts. |
| 1880..... | 6,100 | 6,013 | 0 99 | 1898..... | 12,850 | 9,002 | 0 70 |
| 1881..... | 5,796 | 4,177 | 0 72 | 1899..... | 15,720 | 11,124 | 0 71 |
| 1882..... | 5,064 | 5,365 | 1 06 | 1900..... | 12,865 | 11,211 | 0 87 |
| 1883..... | 7,623 | 9,224 | 1 21 | 1901..... | 19,657 | 14,534 | 0 74 |
| 1884..... | 10,804 | 11,200 | 1 04 | 1902..... | 24,602 | 17,584 | 0 71 |
| 1885..... | 12,072 | 11,503 | 0 95 | 1903..... | 31,108 | 22,470 | 0 72 |
| 1886..... | 11,021 | 9,347 | 0 85 | 1904..... | 54,359 | 39,639 | 0 73 |
| 1887..... | 10,835 | 8,524 | 0 79 | 1905..... | 98,676 | 71,588 | 0 73 |
| 1888..... | 10,142 | 7,537 | 0 74 | 1906..... | 134,334 | 93,630 | 0 70 |
| 1889..... | 13,079 | 9,363 | 0 72 | 1907 (9 mos.)..... | 88,919 | 67,573 | 0 76 |
| 1890..... | 8,149 | 5,360 | 0 66 | 1908..... | 129,379 | 99,611 | 0 77 |
| 1891..... | 6,259 | 4,273 | 0 68 | 1909..... | 153,934 | 106,263 | 0 69 |
| 1892..... | 6,132 | 4,241 | 0 69 | Calendar Year. | | | |
| 1893..... | 6,879 | 4,917 | 0 71 | 1910..... | 212,502 | 138,847 | 0 65 |
| 1894..... | 6,766 | 4,907 | 0 73 | 1911..... | 228,538 | 161,985 | 0 71 |
| 1895..... | 12,008 | 5,743 | 0 48 | 1912..... | 329,925 | 207,481 | 0 63 |
| 1896..... | 10,239 | 7,331 | 0 72 | 1913..... | 386,693 | 238,271 | 0 62 |
| 1897..... | 16,108 | 10,529 | 0 65 | 1914*..... | 340,828 | 211,123 | 0 62 |

*Duty 20 per cent.

It will be observed that the Provinces of Ontario and Quebec, being the chief centres of population in Canada, are the largest producers of lime, the former producing in 1914, 41 per cent of the total value, and the latter 29 per cent. The western provinces accounted for about 15 per cent of the total in 1914, as against 22 per cent in 1913 and 28 per cent in 1912.

Statistics of the annual production of lime in Ontario, as published by the Ontario Bureau of Mines since 1896, are shown in the next table. For the years previous to 1910 these returns are slightly higher than those obtained by the Mines Branch.

Annual Production of Lime in Ontario.

(As ascertained by the Ontario Bureau of Mines.)

| Calendar Year. | Bushels. | Value. | Cents per bushel. | Calendar Year. | Bushels. | Value. | Cents per bushel. |
|----------------|-----------|---------|-------------------|----------------|-----------|---------|-------------------|
| | | \$ | | | | \$ | |
| 1896..... | 1,800,000 | 222,000 | 12 | 1906..... | 2,885,000 | 496,785 | 17 |
| 1897..... | | | | 1907..... | 2,650,000 | 418,700 | 17 |
| 1898..... | 2,620,000 | 308,000 | 12 | 1908..... | 2,442,331 | 448,596 | 18 |
| 1899..... | 4,342,500 | 535,000 | 12 | 1909..... | 2,633,500 | 470,858 | 18 |
| 1900..... | 3,893,000 | 544,000 | 14 | 1910..... | 2,889,235 | 474,531 | 16 |
| 1901..... | 4,100,000 | 550,000 | 13 | 1911..... | 2,469,773 | 402,340 | 16 |
| 1902..... | 4,300,000 | 617,000 | 14 | 1912..... | 2,297,525 | 381,672 | 17 |
| 1903..... | 3,400,000 | 520,000 | 15 | 1913..... | 2,300,991 | 390,600 | 17 |
| 1904..... | 2,600,000 | 406,800 | 16 | 1914*..... | 2,075,228 | 333,363 | 16 |
| 1905..... | 3,100,000 | 424,700 | 14 | | | | |

* Preliminary.

SAND-LIME BRICK.

The manufacture of sand-lime brick in Canada, is a comparatively new industry, and the first returns of production were obtained for the year 1907, when there was a production by ten firms amounting to 16,492,971 brick, valued at \$167,795.

In 1914, the total sales were reported as 70,650,030 brick, valued at \$609,515, or an average of \$8.63 per thousand, as against sales in 1913 of 92,586,676 brick, valued at \$906,665, or an average of \$9.79 per thousand.

Stocks of brick on hand at the end of the year were reported as 16,796,000 brick.

Annual statistics of production since 1907 are shown below:—

Annual Production of Sand-Lime Brick.

| Calendar Year. | No. of firms reporting. | Number sold. | Value | Per M |
|----------------|-------------------------|--------------|-----------|---------|
| | | | \$ | \$ cts. |
| 1907..... | 10 | 16,492,971 | 167,795 | 10 17 |
| 1908..... | 9 | 17,288,260 | 152,856 | 8 84 |
| 1909..... | 9 | 27,052,864 | 201,650 | 7 45 |
| 1910..... | 13 | 44,593,541 | 371,857 | 8 34 |
| 1911..... | 16 | 51,535,243 | 442,427 | 8 58 |
| 1912..... | 20 | 96,448,402 | 1,020,386 | 10 58 |
| 1913..... | 22 | 92,586,676 | 906,665 | 9 79 |
| 1914..... | 21 | 70,650,030 | 609,515 | 8 63 |

SAND AND GRAVEL.

Previous to 1912, no attempt had been made by this Department to obtain statistics of the production of building sand or of gravel in Canada. In 1912, however, a beginning was made, the returns received showing a production of sand and gravel, valued at \$1,512,099.

For the year 1913 the collection was extended to include a record of the production of sand and gravel for railroad ballasting, but, at the time of closing the statistics, several important returns had not been received. However, the total value of the production as reported was \$2,258,874.

The total value of the production in 1914 as reported was \$2,505,310, but it is probable that the record is more complete than for the previous years which doubtless accounts in large measure for the fact that an increase in production is shown.

The production by provinces during the past three years was as follows:—

Annual Production of Sand and Gravel.

| Province. | 1912. | 1913. | 1914. |
|-----------------------|---------|---------|---------|
| | \$ | \$ | \$ |
| P. E. Island..... | 13,549 | 101,201 | 100,016 |
| Nova Scotia..... | | | |
| New Brunswick..... | 243,126 | 638,778 | 370,713 |
| Quebec..... | 363,668 | 638,771 | 833,635 |
| Ontario..... | 101,653 | 197,719 | 314,081 |
| Manitoba..... | 255,453 | 236,377 | 222,019 |
| Saskatchewan..... | 148,704 | 265,165 | 273,115 |
| Alberta..... | 385,946 | 180,863 | 391,731 |
| British Columbia..... | | | |

Statistics of the exports and imports of sand and gravel, are published in the annual reports of the Department of Customs, and the following tables are compiled from this record since 1893.

During 1914, there were exported from Canada 952,370 tons of sand and gravel, valued at \$802,358; while during the same year there were imported 273,812 tons, valued at \$224,759.

Annual Exports of Sand and Gravel.

| Calendar Year. | Tons. | Value. | Average value. | Calendar Year. | Tons. | Value. | Average value. |
|----------------|---------|---------|----------------|----------------|---------|---------|----------------|
| | | \$ | Cents. | | | \$ | Cents. |
| 1893..... | 329,116 | 121,795 | 37 | 1904..... | 399,809 | 129,803 | 32 |
| 1894..... | 324,656 | 86,940 | 27 | 1905..... | 306,935 | 152,805 | 50 |
| 1895..... | 277,162 | 118,359 | 43 | 1906..... | 336,550 | 139,712 | 41 |
| 1896..... | 224,769 | 80,110 | 36 | 1907..... | 298,095 | 119,853 | 40 |
| 1897..... | 152,963 | 76,729 | 50 | 1908..... | 298,954 | 161,387 | 54 |
| 1898..... | 165,954 | 90,498 | 55 | 1909..... | 481,584 | 256,166 | 53 |
| 1899..... | 242,450 | 101,640 | 42 | 1910..... | 624,824 | 407,974 | 65 |
| 1900..... | 197,558 | 101,666 | 51 | 1911..... | 573,494 | 408,110 | 71 |
| 1901..... | 197,302 | 117,465 | 60 | 1912..... | 660,090 | 459,952 | 70 |
| 1902..... | 159,793 | 119,120 | 75 | 1913..... | 644,633 | 440,956 | 68 |
| 1903..... | 355,792 | 124,006 | 35 | 1914..... | 952,370 | 802,358 | 84 |

Annual Imports of Sand and Gravel.

| Fiscal Year. | Tons. | Value. | Average value. | Fiscal Year. | Tons. | Value. | Average value. |
|--------------|--------|--------|----------------|-----------------|---------|---------|----------------|
| | | \$ | \$ cts. | | | \$ | \$ cts. |
| 1893..... | 26,065 | 31,739 | 1 22 | 1904..... | 110,634 | 107,547 | 0 97 |
| 1894..... | 41,573 | 33,506 | 0 81 | 1905..... | 85,339 | 92,722 | 1 09 |
| 1895..... | 19,609 | 24,779 | 1 26 | 1906..... | 116,500 | 173,727 | 1 49 |
| 1896..... | 18,953 | 24,604 | 1 30 | 1907 (9 mos.).. | 171,700 | 177,412 | 1 03 |
| 1897..... | 21,308 | 25,222 | 1 18 | 1908..... | 266,704 | 223,043 | 0 84 |
| 1898..... | 32,148 | 43,287 | 1 35 | 1909..... | 132,158 | 136,011 | 1 03 |
| 1899..... | 30,288 | 42,209 | 1 39 | Calendar Year. | | | |
| 1900..... | 35,713 | 41,280 | 1 16 | 1910..... | 195,796 | 196,766 | 1 00 |
| 1901..... | 35,749 | 42,891 | 1 20 | 1911..... | 241,375 | 246,613 | 1 02 |
| 1902..... | 47,381 | 58,668 | 1 24 | 1912..... | 532,721 | 445,781 | 0 84 |
| 1903..... | 91,518 | 95,647 | 1 05 | 1913..... | 439,673 | 440,343 | 1 00 |
| | | | | 1914..... | 273,812 | 224,759 | 0 82 |

SLATE.

There is a small annual production of slate in Canada obtained from the New Rockland quarries, Melbourne township, Richmond county, and from quarries at Botsford in Temiscouata county, both operated by Messrs. Fraser and Davies.

The production in 1914 was 1,075 squares valued at \$4,837 as compared with a production in 1913 of 1,432 squares, valued at \$6,444.

Annual Production of Slate.

| Calendar Year. | Quantity* | Value. | Calendar Year. | Quantity* | Value. |
|----------------|-----------|---------|----------------|-----------|--------|
| | Tons. | \$ | | Squares. | \$ |
| 1886..... | 5,345 | 64,675 | 1900..... | | 12,100 |
| 1887..... | 7,357 | 89,000 | 1901..... | | 9,980 |
| 1888..... | 5,314 | 90,689 | 1902..... | | 19,200 |
| 1889..... | 6,935 | 119,160 | 1903..... | 5,510 | 22,040 |
| 1890..... | 6,368 | 100,250 | 1904..... | 5,277 | 23,247 |
| 1891..... | 5,000 | 65,000 | 1905..... | | 21,568 |
| 1892..... | 5,180 | 69,070 | 1906..... | | 24,446 |
| 1893..... | 7,112 | 90,825 | 1907..... | 4,335 | 20,056 |
| 1894..... | | 75,550 | 1908..... | 2,950 | 13,496 |
| 1895..... | | 58,900 | 1909..... | 4,000 | 19,000 |
| 1896..... | | 53,370 | 1910..... | 3,959 | 18,492 |
| 1897..... | | 42,800 | 1911..... | 1,833 | 8,248 |
| 1898..... | | 40,791 | 1912..... | 1,894 | 8,939 |
| 1899..... | | 33,406 | 1913..... | 1,432 | 6,444 |
| | | | 1914..... | 1,075 | 4,837 |

* From 1903, in squares; previously, in tons.

No exports of slate have been reported since 1896 with the exception of the years 1908 and 1909.

The imports of slate during the past eight years ranged from \$100,000 to over \$200,000 per annum.

The total value of the imports during the calendar year, 1914, was \$213,256, and included: roofing slate, \$91,977; school writing slate, \$54,723; slate pencils, \$6,514; mantels, \$598; and other slates and manufactures of, \$59,444. The total value of the imports during the calendar year 1913 was \$235,474, comprising: roofing slate, \$97,730; school writing slate, \$51,953; slate pencils, \$9,166; and other slates and manufactures of, \$76,625. The imports of roofing slate, school writing slate, and manufactures of slate n.o.p., are chiefly from the United States. Some roofing slate is also imported from Great Britain, while slate pencils come chiefly from Germany and the United States.

Statistics of imports and exports are shown in the following tables:—

Imports of Slate During the Years 1911, 1912, 1913, and 1914.

| Slate and manufactures of. | Calendar year 1911. | Calendar year 1912. | Calendar year 1913. | Calendar year 1914. |
|---|---------------------------|---------------------------|---------------------------|---------------------------|
| | \$ | \$ | \$ | \$ |
| Roofing slate..... | 83,075 | 88,911 | 97,730 | 91,977 |
| School writing slate..... | 35,049 | 39,858 | 51,953 | 54,723 |
| Slate pencils..... | 6,036 | 6,978 | 9,166 | 6,514 |
| Slate of all kinds and manufactures of..... | 45,525 | 65,896 | 76,625 | 59,444 |
| Mantels..... | | | | 598 |
| | 169,685 | 200,643 | 235,474 | 213,256 |

Exports of Slate.

| Calendar Year. | Tons. | Value. | Calendar Year. | Tons. | Value. |
|----------------|-------|--------|-------------------|-------|--------|
| 1884..... | 539 | 6,845 | 1893..... | 178 | 3,168 |
| 1885..... | 346 | 5,274 | 1894..... | 187 | 3,610 |
| 1886..... | 34 | 495 | 1895..... | 36 | 574 |
| 1887..... | 27 | 373 | 1896..... | 301 | 8,913 |
| 1888..... | 22 | 475 | 1897 to 1907..... | Nil. | Nil. |
| 1889..... | 26 | 3,303 | 1908..... | | 2,539 |
| 1890..... | 12 | 153 | 1909..... | 134 | 612 |
| 1891..... | 15 | 195 | 1910 to 1914..... | Nil. | Nil. |
| 1892..... | 87 | 2,038 | | | |

Imports of Slate.

| | Value. | | Value. | | Value. |
|--------------|--------|--------------|--------|--------------------|---------|
| Fiscal Year. | \$ | Fiscal Year. | \$ | Fiscal Year. | \$ |
| 1880..... | 21,431 | 1892..... | 50,441 | 1904..... | 86,057 |
| 1881..... | 22,184 | 1893..... | 51,179 | 1905..... | 93,228 |
| 1882..... | 24,543 | 1894..... | 29,267 | 1906..... | 112,941 |
| 1883..... | 24,968 | 1895..... | 19,471 | 1907 (9 mos.)..... | 95,520 |
| 1884..... | 28,816 | 1896..... | 24,176 | 1908..... | 131,069 |
| 1885..... | 28,169 | 1897..... | 21,615 | 1909..... | 124,065 |
| 1886..... | 27,852 | 1898..... | 24,907 | Calendar Year. | |
| 1887..... | 27,845 | 1899..... | 33,100 | 1910..... | 142,285 |
| 1888..... | 23,151 | 1900..... | 53,707 | 1911..... | 169,685 |
| 1889..... | 41,370 | 1901..... | 72,187 | 1912..... | 200,643 |
| 1890..... | 22,871 | 1902..... | 72,601 | 1913..... | 235,474 |
| 1891..... | 46,104 | 1903..... | 84,437 | 1914..... | 213,256 |

STONE.¹

Statistics of stone production given herewith include the sales of all classes of stone used for building, monumental, and ornamental purposes, stone for paving purposes, curbstone, and flagstone, rubble, rip-rap, and crushed stone, limestone, for furnace flux, sugar factories, etc., but stone used for burning lime or the manufacture of cement is not included.

The kinds of stone quarried have been classed as granite (including trap rock, syenite, and other igneous rocks), limestone, sandstone, and marble.

The records are practically confined to quarry operations and the production of sawn or polished stone when these operations are carried on by the quarry operators. In addition to this production of stone by regular operators, there is no doubt a large stone production by individuals, such as farmers, and others, for house or barn foundations, concrete work, etc., of which it would be impracticable to obtain any satisfactory record. Much stone is also used in railway construction work and in road building, of which the record is probably very incomplete.

It is impossible, except in a few cases, to show the quantity of stone production, so that the value only of the shipment can be given.

The total value of the production of stone in 1914, according to returns received, was \$5,469,056, as compared with a value of \$5,504,639 in 1913, showing a slight decrease amounting to \$35,583, or less than one per cent.

The number of active firms reporting in 1914 was 219, the total number of men employed 5,929, and the total wages paid \$2,871,817; in 1913, the number of active firms reporting was 218, the number of men employed 6,131, and wages paid \$3,219,465.

Of the total value of the 1914 production, limestone contributed \$2,672,781, or 48·9 per cent; granite \$2,176,602, or 39·8 per cent; sandstone \$487,140, or 8·9 per cent, and marble \$132,533, or 2·4 per cent.

Stone was used for building purposes to the value of \$1,632,763, or 29·8 per cent of the total; monumental and ornamental to the value of \$201,348, or 3·7 per cent; curb, paving and flagstone \$217,578, or 4 per cent; rubble \$1,236,157, or 22·6 per cent; crushed stone \$1,951,337 or 35·7 per cent; and furnace flux 427,966 tons, valued at \$229,873, or 4·2 per cent.

¹ A special investigation has been undertaken by the Mines Branch on the building and ornamental stones of Canada, by Prof. W. A. Parks, of Toronto University, and three reports of this series have been completed, as follows:—

No. 100. "The Building Stones of Canada, Vol. I. "Building and Ornamental Stones of Ontario."
No. 203. "Building Stones of Canada, Vol. II." "Building and Ornamental Stones of the Maritime Provinces."
No. 279. "Building Stones of Canada, Vol. III." "Building and Ornamental Stones of the Province of Quebec."

By provinces, Quebec again shows the largest output, having a value of \$2,286,078, or 41·8 per cent of the total; being made up of limestone to the value of \$1,326,943; granite valued at \$842,845; marble \$98,890. Ontario takes second place with a production of \$1,253,849, or 23 per cent of the total, of which limestone is credited with \$853,906; granite \$309,720; sandstone \$59,923; and marble \$30,300. British Columbia ranks third in order of importance with a total of \$1,024,683, including granite \$918,131; sandstone \$51,774; limestone \$51,435; and marble \$3,343. The production in Manitoba was valued at \$361,912, made up of limestone \$346,258 and granite \$15,654. The Nova Scotia production was valued at \$221,090, comprising: limestone \$94,239; granite \$65,727; and sandstone \$61,124. The Alberta production was reported as \$60,272, all sandstone. New Brunswick is credited with \$261,172 made up chiefly of sandstone and granite.

Production of Stone by Provinces, 1914.

| Province. | Granite. | Lime-stone. | Marble. | Sand-stone. | Total. | % | Labour. | |
|---------------------|-----------|-------------|---------|-------------|-----------|-------|------------------------|-----------|
| | | | | | | | No. men em- ployed. | Wages. |
| | \$ | \$ | \$ | \$ | \$ | | | \$ |
| Nova Scotia..... | 65,727 | 94,239 | ..... | 61,124 | 221,090 | 4·1 | 441 | 120,944 |
| New Brunswick.... | 24,525 | ..... | ..... | 236,647 | 261,172 | 4·8 | 277 | 156,619 |
| Quebec..... | 842,845 | 1,326,943 | 98,890 | 17,400 | 2,286,078 | 41·8 | 2,400 | 1,145,873 |
| Ontario..... | 309,720 | 853,906 | 30,300 | 59,923 | 1,253,849 | 22·9 | 1,575 | 645,728 |
| Manitoba..... | 15,654 | 346,258 | ..... | ..... | 361,912 | 6·6 | 373 | 190,241 |
| Alberta..... | ..... | ..... | ..... | 60,272 | 60,272 | 1·1 | 78 | 46,943 |
| British Columbia... | 918,131 | 51,435 | 3,343 | 51,774 | 1,024,683 | 18·7 | 785 | 565,469 |
| Total..... | 2,176,602 | 2,672,781 | 132,533 | 487,140 | 5,469,056 | ..... | 5,929 | 2,871,817 |
| Per cent..... | 39·8 | 48·9 | 2·4 | 8·9 | ..... | 100·0 | ..... | ..... |

Production of Stone by Provinces, 1913.

| Province. | Granite. | Lime-stone. | Marble. | Sand-stone. | Total. | % | Labour. | |
|---------------------|-----------|-------------|---------|-------------|-----------|--------|------------------------|-----------|
| | | | | | | | No. men em- ployed. | Wages. |
| | \$ | \$ | \$ | \$ | \$ | | | \$ |
| Nova Scotia..... | 29,302 | 258,719 | ..... | 62,490 | 350,511 | 6·3 | 733 | 200,598 |
| New Brunswick.... | 32,945 | ..... | ..... | 70,787 | 103,732 | 1·9 | 285 | 104,828 |
| Quebec..... | 790,896 | 1,307,428 | 231,137 | ..... | 2,329,461 | 42·3 | 2,208 | 1,316,306 |
| Ontario..... | 324,062 | 1,196,130 | 18,238 | 54,738 | 1,593,168 | 29·0 | 1,621 | 812,137 |
| Manitoba..... | 6,920 | 382,984 | ..... | ..... | 389,904 | 7·0 | 558 | 280,224 |
| Alberta..... | ..... | 20,000 | ..... | 136,984 | 156,984 | 2·9 | 116 | 113,468 |
| British Columbia... | 469,666 | 38,830 | 600 | 71,783 | 580,879 | 10·6 | 610 | 391,904 |
| Total..... | 1,653,791 | 3,204,091 | 249,975 | 396,782 | 5,504,639 | ..... | 6,131 | 3,219,465 |
| Per cent..... | 30·0 | 58·2 | 4·6 | 7·2 | ..... | 100·00 | ..... | ..... |

Value of Stone for Various Purposes in 1914.

| Kind. | Building. | Orna- mental and monu- mental. | Paving and curb- stone. | Rubble. | Crushed. | Furnace flux. | Total. |
|----------------|-----------|--|----------------------------------|-----------|-----------|------------------|-----------|
| | \$ | \$ | \$ | \$ | \$ | \$ | \$ |
| Granite..... | 496,261 | 93,948 | 138,443 | 793,736 | 654,214 | ..... | 2,176,602 |
| Limestone..... | 876,544 | 13,504 | 55,420 | 241,698 | 1,255,742 | 229,873 | 2,672,781 |
| Marble..... | 33,643 | 93,386 | ..... | 2,614 | 2,890 | ..... | 132,533 |
| Sandstone..... | 226,315 | 510 | 23,715 | 198,109 | 38,491 | ..... | 487,140 |
| Total..... | 1,632,763 | 201,348 | 217,578 | 1,236,157 | 1,951,337 | 229,873 | 5,469,056 |

Value of Stone Sold for Various Purposes in 1913.

| Kind. | Building. | Orna- mental and monu- mental. | Paving and curb- stone. | Rubble. | Crushed. | Furnace flux. | Total. |
|----------------|-----------|--|----------------------------------|---------|-----------|------------------|-----------|
| | \$ | \$ | \$ | \$ | \$ | \$ | \$ |
| Granite..... | 554,505 | 47,377 | 243,534 | 266,442 | 541,933 | ..... | 1,653,791 |
| Limestone..... | 790,795 | 8,676 | 14,073 | 257,419 | 1,680,834 | 452,294 | 3,204,091 |
| Marble..... | 18,838 | 230,739 | 398 | ..... | ..... | ..... | 249,975 |
| Sandstone..... | 322,668 | 1,352 | 4,950 | 40,046 | 27,766 | ..... | 396,782 |
| Total..... | 1,686,806 | 288,144 | 262,955 | 563,907 | 2,250,533 | 452,294 | 5,504,639 |

Production of Stone by Provinces and for Purposes Used, 1914.

| Province. | Building. | Orna- mental and monu- mental. | Paving and curb- stone. | Rubble. | Crushed. | Furnace flux. | Total. |
|-----------------------|-----------|--|----------------------------------|-----------|-----------|------------------|-----------|
| | \$ | \$ | \$ | \$ | \$ | \$ | \$ |
| Nova Scotia..... | 78,504 | 20,964 | 2,649 | 22,083 | 2,651 | 94,239 | 221,090 |
| New Brunswick..... | 52,287 | 13,983 | 10,702 | 184,200 | ..... | ..... | 261,172 |
| Quebec..... | 916,978 | 154,012 | 97,895 | 112,655 | 994,637 | 9,901 | 2,286,078 |
| Ontario..... | 153,871 | 12,089 | 100,332 | 180,272 | 859,085 | 74,298 | 1,253,849 |
| Manitoba..... | 230,160 | ..... | ..... | ..... | 16,654 | ..... | 361,912 |
| Alberta..... | 59,572 | ..... | ..... | 700 | ..... | ..... | 60,272 |
| British Columbia..... | 151,391 | 300 | 6,000 | 736,247 | 79,310 | 51,435 | 1,024,683 |
| Total..... | 1,632,763 | 201,348 | 217,578 | 1,236,157 | 1,951,337 | 229,873 | 5,469,056 |
| Per cent..... | 29.8 | 3.7 | 4.0 | 22.6 | 35.7 | 4.2 | 100.0 |

Production of Stone by Provinces and for Purposes Used, 1913.

| Province. | Building. | Orna- mental and monu- mental. | Paving and curb- stone. | Rubble. | Crushed. | Furnace flux. | Total. |
|-----------------------|-----------|--|----------------------------------|---------|-----------|------------------|-----------|
| | \$ | \$ | \$ | \$ | \$ | \$ | \$ |
| Nova Scotia..... | 67,576 | 8,822 | 7,244 | 5,502 | 12,900 | 248,467 | 350,511 |
| New Brunswick..... | 68,647 | 126 | 10,843 | 21,403 | 2,713 | ..... | 103,732 |
| Quebec..... | 900,478 | 270,304 | 97,884 | 60,784 | 999,046 | 965 | 2,329,461 |
| Ontario..... | 241,928 | 7,222 | 139,920 | 119,487 | 920,579 | 164,032 | 1,593,168 |
| Manitoba..... | 162,384 | 450 | ..... | 94,270 | 132,800 | ..... | 389,904 |
| Alberta..... | 133,030 | 386 | ..... | 23,568 | ..... | ..... | 156,984 |
| British Columbia..... | 112,763 | 834 | 7,064 | 238,893 | 182,495 | 38,830 | 580,879 |
| Total..... | 1,686,806 | 288,144 | 262,955 | 563,907 | 2,250,533 | 452,294 | 5,504,639 |
| Per cent..... | 30.7 | 5.2 | 4.8 | 10.2 | 40.9 | 8.2 | 100.0 |

Exports and Imports:—The exports of stone from Canada in 1914 were valued at \$72,080 as against \$93,840 in 1913 and \$33,242 in 1912. The principal item in the export of stone during the past three years has been building stone unwrought, of which the exports in 1914 were 63,009 tons, valued at \$46,198. The exports of dressed stone in 1914 including both ornamental and building stone, were valued at \$2,122.

The exports of the several classes of stone during the past three years, as shown by the Customs' record, were as follows:—

Exports of Stone During the Calendar Years 1912, 1913, 1914.

| | 1912. | | 1913. | | 1914. | |
|---|---------|--------|---------|--------|--------|--------|
| | Tons. | Value. | Tons. | Value. | Tons. | Value. |
| Stone— | | \$ | | \$ | | \$ |
| Crushed..... | ..... | ..... | 4,814 | 3,126 | 25,130 | 18,153 |
| Ornamental, granite, marble, etc., unwrought..... | 2,339 | 1,826 | 1,942 | 687 | 231 | 5,607 |
| Building, freestone, limestone, etc., unwrought..... | 108,516 | 28,795 | 191,981 | 82,646 | 63,009 | 46,198 |
| Ornamental, granite, marble, etc., dressed..... | ..... | 2,458 | ..... | 7,381 | ..... | 1,752 |
| Building, freestone, limestone, etc., dressed..... | ..... | 163 | ..... | 0 | ..... | 370 |
| ..... | ..... | 33,242 | ..... | 93,840 | ..... | 72,080 |

Exports of Stone and Marble, Wrought and Unwrought.

| Calendar Year. | Wrought. | Unwrought | Calendar Year. | Wrought. | Unwrought. |
|----------------|----------|-----------|----------------|----------|------------|
| | \$ | \$ | | \$ | \$ |
| 1890..... | 21,725 | 43,611 | 1903..... | 7,684 | 46,295 |
| 1891..... | 13,398 | 46,162 | 1904..... | 4,760 | 17,802 |
| 1892..... | 7,698 | 47,424 | 1905..... | 3,545 | 13,089 |
| 1893..... | 9,102 | 12,532 | 1906..... | 23,097 | 4,675 |
| 1894..... | 22,576 | 34,130 | 1907..... | 4,233 | 3,087 |
| 1895..... | 8,587 | 51,616 | 1908..... | 15,194 | 36,820 |
| 1896..... | 4,934 | 32,897 | 1909..... | 33,598 | 24,087 |
| 1897..... | 9,415 | 42,034 | 1910..... | 5,352 | 22,219 |
| 1898..... | 2,526 | 65,370 | 1911..... | 1,436 | 26,899 |
| 1899..... | 5,092 | 101,931 | 1912..... | 2,621 | 30,621 |
| 1900..... | 5,933 | 115,711 | 1913..... | 7,381 | 86,459 |
| 1901..... | 5,917 | 157,739 | 1914..... | 2,122 | 69,958 |
| 1902..... | 8,632 | 124,829 | | | |

The imports of stone are classified as: building stone of all kinds, except marble; manufactures of granite and other stone; and marble and its manufactures. The total value of the imports during the calendar year 1914, was \$1,252,869, as compared with a value of \$1,640,849 in 1913, showing a decrease of \$387,980, or about 23 per cent.

The imports during 1914 comprised: building stone, (rough) valued at \$72,147, building stone (dressed) \$252,563; granite and manufactures of granite \$235,587; paving blocks \$4,428; marble and manufactures of, \$465,563; and refuse stone 416,816 tons, valued at \$222,581.

The total value of the imports from the United States in 1914 was \$909,618; Great Britain, \$202,055; Italy, \$37,610; and from other countries, \$103,586.

Of the total imports in 1913, \$570,116 in value was classed as building stone, and included \$105,576 worth of rough stone, and \$464,540 worth of dressed stone. The imports of sawn granite, manufactures of granite, and manufacture of stone n.o.p. were valued at \$250,077; paving blocks \$52,321; marble and manufactures of, \$577,028. There was also an importation of refuse stone amounting to 356,073 tons, valued at \$191,307.

The total value of the imports from the United States in 1913 was \$1,287,440; Great Britain, \$185,531; from Italy, \$40,335; and from other countries, \$127,543. During both years the imports were derived chiefly from the United States and Great Britain, the United States supplying building stone, paving blocks, and marble principally; and Great Britain, mainly manufactures of granite. Marble is obtained also in some quantity from Italy and other countries.

Total Imports of Stone During the Calendar Years 1913 and 1914.

| Imports. | 1913. | | 1914. | |
|--|---------|-----------|---------|-----------|
| | Tons. | Value. | Tons. | Value. |
| | | \$ | | \$ |
| Building stone, rough ¹ | | 105,576 | | 72,147 |
| Building stone, dressed ² | | 464,540 | | 252,563 |
| Refuse stone ³ | 356,073 | 191,307 | 416,816 | 222,581 |
| Granite, sawn only..... | | 14,979 | | 5,346 |
| Granite, manufactures of..... | | 174,155 | | 196,622 |
| Paving blocks..... | | 52,321 | | 4,428 |
| Manufactures of stone, n.o.p..... | | 60,943 | | 33,619 |
| Marble and manufactures of:— | | | | |
| Marble, sawn or sand rubbed, not polished..... | | 258,225 | | 204,863 |
| Marble, rough, not hammered or chiselled..... | | 128,475 | | 115,339 |
| Marble, manufactures of, n.o.p..... | | 190,328 | | 145,361 |
| | | 1,640,849 | | 1,252,869 |

¹ Flagstone, granite, rough sandstone, and all building stone not hammered, sawn, or chiselled.

² Flagstone and all other building stone, sawn or dressed, or partially dressed.

³ Stone refuse not sawn, hammered, or chiselled, not fit for flagstone, building stone, or paving.

Imports of Stone, Showing Country of Origin, Calendar Year 1914.

| Imports. | Great Britain. | | United States. | | Italy. | Other countries |
|--|----------------|---------|----------------|---------|--------|-----------------|
| | Tons. | Value. | Tons. | Value. | Value. | Value. |
| | | \$ | | \$ | \$ | \$ |
| Building stone, rough ¹ | | 718 | | 71,429 | | |
| Building stone, dressed ² | | 1,189 | | 251,374 | | |
| Refuse stone..... | | | 300,072 | 146,860 | | 75,725 |
| Granite, sawn only..... | | 851 | | 4,495 | | |
| Granite, manufactures of..... | | 178,946 | | 14,580 | | 3,096 |
| Paving blocks..... | | | | 4,428 | | |
| Manufactures of stone, n.o.p..... | | 6,645 | | 23,700 | | 3,274 |
| Marble and manufactures of:— | | | | | | |
| Marble, sawn or sand rubbed, not polished..... | | 1,142 | | 174,977 | 28,095 | 649 |
| Marble, rough, not hammered or chiselled..... | | | | 100,783 | 9,515 | 5,041 |
| Marble, manufactures of n.o.p..... | | 12,564 | | 116,992 | | 15,805 |
| Total..... | | 202,055 | | 909,618 | 37,610 | 103,586 |
| | | 16.1% | | 72.6% | 3.0% | 8.3% |

¹ Flagstone, granite, rough sandstone, and all building stone not hammered, sawn, or chiselled.

² Flagstone; all other building stone, sawn, or dressed.

Annual Imports of Stone.

| Fiscal Year. | BUILDING STONE. | | Manufac- tures of granite, etc., Paving blocks. | Marble. | Flagstone. | Total value. |
|----------------|-----------------|----------|--|---------|------------------|-----------------|
| | Rough. | Dressed. | | | | |
| | \$ | \$ | \$ | \$ | \$ | \$ |
| 1880..... | 32,824 | 3,146 | 29,408 | 63,015 | ..... | 128,393 |
| 1881..... | 7,823 | 50,326 | 36,877 | 85,977 | 241 | 181,244 |
| 1882..... | 32,848 | 775 | 37,267 | 109,505 | 848 | 181,243 |
| 1883..... | 33,429 | 1,632 | 45,636 | 128,520 | 99 | 209,316 |
| 1884..... | 46,232 | 4,856 | 45,290 | 108,771 | 1,158 | 206,307 |
| 1885..... | 28,433 | 2,058 | 39,867 | 102,835 | 1,756 | 174,949 |
| 1886..... | 36,776 | 4,899 | 41,984 | 117,752 | 9,443 | 210,854 |
| 1887..... | 47,819 | 6,549 | 41,829 | 104,250 | 10,966 | 211,413 |
| 1888..... | 84,263 | 2,110 | 47,487 | 94,681 | 21,077 | 249,618 |
| 1889..... | 89,723 | 10,591 | 61,341 | 118,421 | 15,451 | 295,527 |
| 1890..... | 126,456 | 5,699 | 84,396 | 99,353 | 48,995 | 364,899 |
| 1891..... | 151,119 | 19,771 | 61,051 | 107,661 | 36,348 | 372,950 |
| 1892..... | 85,169 | 10,381 | 39,479 | 106,268 | 15,048 | 256,345 |
| 1893..... | 47,609 | 8,901 | 49,323 | 96,177 | 8,500 | 210,510 |
| 1894..... | 48,097 | 4,811 | 49,510 | 94,657 | 2,429 | 199,504 |
| 1895..... | 37,732 | 6,550 | 51,050 | 83,422 | 84 | 178,838 |
| 1896..... | 42,737 | 11,393 | 51,499 | 90,065 | Nil. | 195,694 |
| 1897..... | 27,442 | 11,272 | 34,026 | 77,150 | 227 | 150,117 |
| 1898..... | 25,322 | 3,173 | 41,240 | 95,894 | 1,540 | 167,129 |
| 1899..... | 43,494 | 4,546 | 60,148 | 104,879 | Nil. | 210,067 |
| 1900..... | 63,376 | 1,157 | 57,039 | 94,017 | 63 | 215,652 |
| 1901..... | 45,039 | 1,039 | 66,639 | 96,159 | 116 | 208,992 |
| 1902..... | 69,972 | 29,102 | 72,397 | 130,424 | 1,231 | 303,126 |
| 1903..... | 71,202 | 16,664 | 78,629 | 153,481 | ** | 319,976 |
| 1904..... | 59,864 | 33,914 | 141,165 | 181,511 | ..... | 416,454 |
| 1905..... | 49,004 | 53,813 | 150,160 | 145,466 | ..... | 398,443 |
| 1906..... | 66,994 | 65,134 | 178,435 | 189,589 | ..... | 500,152 |
| 1907*..... | 58,398 | 78,967 | 136,779 | 176,450 | ..... | 450,594 |
| 1908..... | 80,950 | 90,740 | 192,248 | 287,587 | Refuse stone. | 651,525 |
| 1909..... | 63,984 | 72,961 | 193,949 | 200,928 | ..... | 531,822 |
| Calendar Year. | | | | | | |
| 1910..... | 125,531 | 186,064 | 266,313 | 267,215 | ..... | 845,123 |
| 1911..... | 85,084 | 307,784 | 272,512 | 384,252 | 91,214 | 1,140,846 |
| 1912..... | 117,037 | 451,635 | 309,386 | 475,926 | 113,159 | 1,467,143 |
| 1913..... | 105,576 | 464,540 | 302,398 | 577,028 | 191,307 | 1,640,849 |
| 1914..... | 72,147 | 252,563 | 240,015 | 465,563 | 222,581 | 1,252,869 |

* 9 months ending March 1907.

** Included in building stone since 1903.

GRANITE.

The production of granite including trap-rock, syenite, etc., in 1914, according to returns received from 69 active firms reporting, was valued at \$2,176,602, as compared with a production in 1913, by 65 firms, valued at \$1,653,791, showing an increased production in 1914 of \$522,811 or 31.6 per cent.

The largest production is reported from British Columbia in 1914, the value being \$918,131 as against \$469,666 in 1913. The value of the production in Quebec was \$842,845 as against \$790,896 in 1913. Ontario produced granite to the value of \$309,720 in 1914, as compared with \$324,062 in 1913. There was comparatively little change in production in New Brunswick, but an increase of over 100 per cent in the Nova Scotia production. Much of the rough stone quarried in New Brunswick, as well as stone imported from Redbeach, Maine, and Mt. Johnson, Que., is worked

up into finished ornamental and monumental stone in mills at St. George, N.B. The value of the finished stone produced at St. George in 1914 was \$90,840, as against a value of \$85,803 produced in 1913.

Value of Granite Production by Provinces, 1914.

| Province. | Building. | Monu- mental or orna- mental. | Curb, or paving. | Rubble. | Crushed. | Total. |
|-----------------------|-----------|--|---------------------|---------|----------|-----------|
| | \$ | \$ | \$ | \$ | \$ | \$ |
| Nova Scotia..... | 26,324 | 20,614 | 2,649 | 13,940 | 2,200 | 65,727 |
| New Brunswick..... | | *13,823 | 10,702 | | | 24,525 |
| Quebec..... | 370,403 | 57,626 | 45,052 | 12,809 | 356,955 | 842,845 |
| Ontario..... | 3,260 | 1,585 | 74,040 | 30,740 | 200,095 | 309,720 |
| Manitoba..... | | | | | 15,654 | 15,654 |
| British Columbia..... | 96,274 | 300 | 6,000 | 736,247 | 79,310 | 918,131 |
| Total..... | 496,261 | 93,948 | 138,443 | 793,736 | 654,214 | 2,176,602 |

* "Finished" stone in 1914 was valued at \$90,840.

Value of Granite Production by Provinces, 1913.

| Province. | Building. | Monu- mental or orna- mental. | Curb, or paving. | Rubble. | Crushed. | Total. |
|-----------------------|-----------|--|---------------------|---------|----------|-----------|
| | \$ | \$ | \$ | \$ | \$ | \$ |
| Nova Scotia..... | 11,176 | 7,982 | 7,244 | | 2,900 | 29,302 |
| New Brunswick..... | 22,102 | (a) | 10,843 | | | 32,945 |
| Quebec..... | 454,105 | 37,481 | 83,838 | 27,549 | 187,923 | 790,896 |
| Ontario..... | 26,742 | 1,080 | 134,545 | | 161,695 | 324,062 |
| Manitoba..... | | | | | 6,920 | 6,920 |
| British Columbia..... | 40,380 | 834 | 7,064 | 238,893 | 182,495 | 469,666 |
| Total..... | 554,505 | 47,377 | 243,534 | 266,442 | 541,933 | 1,653,791 |

(a) The production of rough granite for ornamental or monumental purposes is included under building stone. Finished stone was produced at St. George to the value of \$85,803.

Annual Production of Granite.

| Calendar Year. | Tons. | Value. | Calendar Year. | Tons. | Value. |
|----------------|--------|---------|----------------|--------|-----------|
| | | \$ | | | \$ |
| 1886..... | 6,062 | 63,309 | 1900..... | | 80,000 |
| 1887..... | 21,217 | 142,506 | 1901..... | | 155,000 |
| 1888..... | 21,352 | 147,305 | 1902..... | | 210,000 |
| 1889..... | 10,197 | 79,624 | 1903..... | | 200,000 |
| 1890..... | 13,307 | 65,985 | 1904..... | | 150,000 |
| 1891..... | 13,637 | 70,056 | 1905..... | | 226,305 |
| 1892..... | 24,302 | 89,326 | 1906..... | | 278,419 |
| 1893..... | 22,521 | 94,393 | 1907..... | 15,136 | 194,712 |
| 1894..... | 16,392 | 109,936 | 1908..... | | 282,320 |
| 1895..... | 19,238 | 84,838 | 1909..... | | 454,824 |
| 1896..... | 19,717 | 106,709 | 1910..... | | 739,516 |
| 1897..... | 19,345 | 61,934 | 1911..... | | 1,119,865 |
| 1898..... | 23,897 | 81,073 | 1912..... | | 1,373,119 |
| 1899..... | 13,418 | 90,542 | 1913..... | | 1,653,791 |
| | | | 1914..... | | 2,176,602 |

LIMESTONE.

The statistics given herewith do not include the value of the stone burned into lime by the quarry operators, nor that of the stone used in the manufacture of cement, a record of lime and cement production being separately given. With this exception, the total value of limestone produced in Canada in 1914 was \$2,672,781, as compared with the value of \$3,204,091 in 1913, or a decrease of about 17 per cent.

There was an increase in the production of building and paving stone, and a falling off in the production of furnace flux, crushed stone and rubble.

The production during 1914 of limestone for building purposes, was valued at \$890,048, as against \$799,471 in 1913. The value of crushed stone in 1914 was \$1,255,742, as against \$1,680,834 in the previous year. Curbstone and paving stone were produced to the value of \$55,420 in 1914, as against \$14,073 in 1913. The value of rubble in 1914 was \$241,698, as against \$257,419 in 1913. The production of furnace flux was 427,966 tons, valued at \$229,873, as compared with 862,774 tons valued at \$452,294 in 1913.

Value of Limestone Production by Provinces, 1914.

| Province. | Building and orna- mental. | Crushed. | Curbstone and paving. | Rubble. | Furnace flux. | | Total. |
|-----------------------|----------------------------------|-----------|-----------------------------|---------|---------------|---------|-----------|
| | | | | | Tons. | \$ | |
| Nova Scotia..... | \$ | \$ | \$ | \$ | 176,817 | 94,239 | 94,239 |
| Quebec..... | 549,575 | 617,392 | 52,843 | 97,232 | 13,467 | 9,901 | 1,326,943 |
| Ontario..... | 120,313 | 563,363 | 2,577 | 93,355 | 116,468 | 74,298 | 853,906 |
| Manitoba..... | 220,160 | 74,987 | | 51,111 | | | 346,258 |
| British Columbia..... | | | | | 121,214 | 51,435 | 51,435 |
| Total..... | 890,048 | 1,255,742 | 55,420 | 241,698 | 427,966 | 229,873 | 2,672,781 |

Value of Limestone Production by Provinces, 1913.

| Province. | Building and orna- mental. | Crushed. | Curbstone and paving. | Rubble. | Furnace flux. | | Total. |
|-----------------------|----------------------------------|-----------|-----------------------------|---------|---------------|---------|-----------|
| | | | | | Tons. | \$ | |
| Nova Scotia..... | \$ | \$ | \$ | \$ | 489,516 | 248,467 | 258,719 |
| Quebec..... | 448,457 | 811,123 | 13,648 | 33,235 | 643 | 965 | 1,307,428 |
| Ontario..... | 188,180 | 733,831 | 425 | 109,662 | 281,246 | 164,032 | 1,196,130 |
| Manitoba..... | 162,834 | 125,880 | | 94,270 | | | 382,984 |
| Alberta..... | | | | 20,000 | | | 20,000 |
| British Columbia..... | | | | | 91,369 | 38,830 | 38,830 |
| Total..... | 799,471 | 1,680,834 | 14,073 | 257,419 | 862,774 | 452,294 | 3,204,091 |

Production of Limestone by Provinces 1909-1912.

| Province. | 1909. | 1910. | 1911. | 1912. |
|-----------------------|-----------|-----------|-----------|-----------|
| | \$ | \$ | \$ | \$ |
| Nova Scotia..... | 161,922 | 192,919 | 245,216 | 275,944 |
| New Brunswick..... | 30 | 315 | 110 | ..... |
| Quebec..... | 972,253 | 962,429 | 1,296,577 | 1,187,751 |
| Ontario..... | 639,674 | 722,763 | 680,461 | 862,052 |
| Manitoba..... | 328,554 | 328,029 | 315,782 | 381,572 |
| British Columbia..... | 37,258 | 43,121 | 56,780 | 55,617 |
| Total..... | 2,139,681 | 2,249,576 | 2,594,926 | 2,762,936 |

MARBLE.

From 1886 to 1896 there was a small production of marble, aggregating, however, only \$45,837 in value for the eleven years. During the next eleven years—1897 to 1907—there is no record of any production. But the opening up of the quarries at Philipsburg and South Stukely, Que., together with the development of quarries in Ontario and British Columbia, has resulted in a considerable production of marble during the past seven years. The total value of the production in 1914 was returned as \$132,533, as compared with \$249,975 in 1913, and \$260,764 in 1912.

Marble quarries were operated during 1914 at Philipsburg and South Stukely, Que., Dungannon and Faraday townships in Ontario, and at Marble Head, B. C. A new quarry was also being opened up in Texada Island, British Columbia.

Annual Production of Marble.

| Calendar Year. | Tons. | Value. | Calendar Year. | Tons. | Value. |
|----------------|-------|--------|-------------------------|-------|---------|
| | | \$ | | | \$ |
| 1886..... | 501 | 9,900 | 1896..... | 224 | 2,405 |
| 1887..... | 242 | 6,224 | 1897 to 1907 inclusive. | Nil. | Nil. |
| 1888..... | 191 | 3,100 | 1908..... | ..... | 125,000 |
| 1889..... | 83 | 980 | 1909..... | ..... | 158,441 |
| 1890..... | 780 | 10,776 | 1910..... | ..... | 158,779 |
| 1891..... | 240 | 1,752 | 1911..... | ..... | 162,783 |
| 1892..... | 340 | 3,600 | 1912..... | ..... | 260,764 |
| 1893..... | 590 | 5,100 | 1913..... | ..... | 249,975 |
| 1894..... | Nil. | Nil. | 1914..... | ..... | 132,533 |
| 1895..... | 200 | 2,000 | | | |

The imports of marble during the calendar year 1914 were valued at \$465,563 as compared with \$577,028 in 1913, and \$475,926 in 1912.

The annual imports of marble since 1880 are shown in the general table of imports, page 357.

SANDSTONE.

The value of the production of sandstone in 1914 is reported as \$487,140, as compared with a value of \$396,782 reported for 1913. The greater part of the sandstone is quarried for building purposes, though large quantities were used for rubble and paving purposes during 1914.

Of the production in 1914, building and ornamental stone was sold to the value of \$226,825, or 47 per cent of the total value of production. There was included in this amount, rough stone valued at \$108,606 and dressed stone valued at \$118,219.

Of the production in 1913, building and ornamental stone was sold to the value of \$324,020, or 82 per cent of the total value, there being included in this amount, rough stone valued at \$142,895 and dressed stone valued at \$181,125.

Value of Sandstone Production by Provinces, 1914.

| Province. | Building and orna- mental. | Crushed. | Paving. | Rubble. | Total. |
|-----------------------|----------------------------------|----------|---------|---------|---------|
| | \$ | \$ | \$ | \$ | \$ |
| Nova Scotia..... | 52,530 | 451 | ..... | 8,143 | 61,124 |
| New Brunswick..... | 52,447 | ..... | ..... | 184,200 | 236,647 |
| Quebec..... | ..... | 17,400 | ..... | ..... | 17,400 |
| Ontario..... | 10,502 | 20,640 | 23,715 | 5,066 | 59,923 |
| Alberta..... | 59,572 | ..... | ..... | 700 | 60,272 |
| British Columbia..... | 51,774 | ..... | ..... | ..... | 51,774 |
| Total..... | 226,825 | 38,491 | 23,715 | 198,109 | 487,140 |

Value of Sandstone Production by Provinces, 1913.

| Province. | Building and orna- mental. | Crushed. | Paving. | Rubble. | Total. |
|-----------------------|----------------------------------|----------|---------|---------|---------|
| | \$ | \$ | \$ | \$ | \$ |
| Nova Scotia..... | 57,240 | ..... | ..... | 5,250 | 62,490 |
| New Brunswick..... | 46,671 | 2,713 | ..... | 21,403 | 70,787 |
| Ontario..... | 14,910 | 25,053 | 4,950 | 9,825 | 54,738 |
| Alberta..... | 133,416 | ..... | ..... | 3,568 | 136,984 |
| British Columbia..... | 71,783 | ..... | ..... | ..... | 71,783 |
| Total..... | 324,020 | 27,766 | 4,950 | 40,046 | 396,782 |

Value of Sandstone Production by Provinces 1909-1912.

| Province. | 1909. | 1910. | 1911. | 1912. |
|-----------------------|---------|---------|---------|---------|
| | \$ | \$ | \$ | \$ |
| Nova Scotia..... | 21,850 | 16,425 | 23,440 | 20,645 |
| New Brunswick..... | 30,609 | 51,793 | 35,337 | 68,260 |
| Quebec..... | | | 450 | |
| Ontario..... | 62,824 | 62,247 | 54,032 | 59,240 |
| Alberta..... | 90,383 | 240,858 | 158,344 | 81,391 |
| British Columbia..... | 168,513 | 130,825 | 179,580 | 99,816 |
| Total..... | 374,179 | 502,148 | 451,183 | 329,352 |

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Canada. Statistics, Dominion Bureau of.
Mining, Metallurgical and Chemical Branch
Annual report on the mineral production
of Canada. 1914.

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